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Publications

MACKENZIE VALLEY PIPELINE INQUIRY

IN THE MATTER OF THE APPLICATIONS BY EACH OF
(a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A
RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS
CROWN LANDS WITHIN THE YUKON TERRITORY AND
THE NORTHWEST TERRITORIES, and
(b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY
THAT MIGHT BE GRANTED ACROSS CROWN LANDS
WITHIN THE NORTHWEST TERRITORIES
FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND
ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION,
OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE
PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

December 18, 1975.

PROCEEDINGS AT INQUIRY

VOLUME 106

CANADIAN ARCTIC
GAS STUDY LTD.

JAN-6 1975

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APPEARANCES:

Mr. Ian G. Scott, Q.C.,
Mr. Stephen T. Goudge,
Mr. Alick Ryder and
Mr. Ian Roland for Mackenzie Valley Pipeline
Inquiry;

Mr. Pierre Genest, Q.C.,
Mr. Jack Marshall, and
Mr. Darryl Carter for Canadian Arctic Gas
Pipeline Limited;
Mr. Reginald Gibbs, Q.C.,
Mr. Alan Hollingworth &
Mr. John W. Lutes, for Foothills Pipe Lines Ltd.;

Mr. Russell Anthony &
Pro. Alastair Lucas for Canadian Arctic Resources
Committee;

Mr. Glen W. Bell and
Mr. Gerry Sutton, for Northwest Territories
Indian Brotherhood, and
Metis Association of the
Northwest Territories;

Mr. John Bayly
or
Miss Leslie Lane for Inuit Tapirisat of Canada,
and The Committee for
Original Peoples Entitle-
ment;

Mr. Ron Veale and
Mr. Allen Lueck for The Council for the Yukon
Indians;

Mr. Carson H. Templeton, for Environment Protection
Board;

Mr. David Reesor for Northwest Territories
Association of Municipal-
ities;

Mr. Murray Sigler for Northwest Territories
Chamber of Commerce.

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1 Yellowknife, N.W.T.

2 December 18, 1975.

3 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

4 MR. BELL: Good morning, sir.

5 Father Fumoleau is with us today and I understand he
6 has a brief submission to make.

7 THE COMMISSIONER: Father
8 Fumoleau?

9 FATHER FUMOLEAU: Mr. Berger,
10 I usually hear you talk mostly about what is going to
11 happen in the future. Today I would like to take you
12 back a few years and present you the book I finished
13 writing on the history of the Indian people of the
14 Northwest Territories, especially of the Mackenzie
15 District. That history covers the time between 1870
16 and 1939. I think it will be quite interesting for the
17 people who are planning to work in the north in the
18 future also because in this period of time, a few years
19 back, some development, some exploitation of the natural
20 resources were planned and some were cited. Some
21 documents dating 1888, for example, about the discovery
22 of oil in the Mackenzie Basin could be dated 1975.

23 Some letters of documents that
24 were written at a time of the Klondike Gold Rush when
25 oil was discovered in Norman Wells in 1920 could also
26 be dated 1975. The results of these exploitations of
27 the resources on the native people created very great
28 concern at this time. I'm not saying this is what you
29 are going to study in the next phase of your Inquiry,
30 I don't like to talk too long tonight. I think it's

1 the last day of work before Christmas time. I would
2 just like to present you this book and hope that you
3 will enjoy reviewing the past, the past history of the
4 north. This history could help us understand what
5 happens now in the north in 1975. Thank you.

6 THE COMMISSIONER: Thank you
7 very much, Father Fumoleau. Well, I just want to
8 express my thanks to Father Fumoleau for coming this
9 morning and presenting me with this copy of his book
10 which I will look forward to reading over the holidays.
11 I have no doubt to my very great benefit, so thank you
12 again, Father.

13 Well, Mr. Anthony?

14 MR. ANTHONY: Mr. Commissioner,
15 before Dr. Lent continues with his evidence in chief,
16 I thought it would be helpful to yourself and the other
17 participants if I indicated how I see the proceedings
18 going today and starting again after the Christmas
19 recess. I am suggesting that Dr. Lent and Dr. Calef's
20 evidence both be read in in chief, and then we commence
21 with the cross-examination of Dr. Lent. I suggest that
22 because from my brief discussion with counsel it does
23 not appear that we would finish with Dr. Lent in any
24 event; or if we did, it would be a bit unfair to both
25 participants and Dr. Lent and hence we would be under
26 some considerable time constraint.

27 Secondly, you will recall that
28 the desire of many participants to have a caribou
29 panel of perhaps conflicting opinions. We had hoped to
30 accomplish that, but because of the timing before

1 Christmas, a number of the participants who had
2 expressed a desire to appear before you were unable
3 to be here. Now that we are going to be reconvening
4 on the 12th, I am hopeful that at least two of these
5 people will be able to appear. In addition, Dr. Mc-
6 Taggart-Cowan will be here on behalf of the E.P.B.,
7 and I would hope that it would be appropriate for per-
8 haps him, for Dr. McTaggart-Cowan to similarly add
9 any additional views he may have on this question.
10 I'm unable to say at this time that we will in fact be
11 able to get these additional people here, and be able
12 to participate in such a panel; but I am hopeful that
13 we will and I will certainly advise participants and
14 the Inquiry prior to Christmas if in fact this is to
15 take place. The desire would be to call these addi-
16 tional people and allow them to interchange ideas and
17 perhaps argue some of the issues that have been raised
18 by people who have already appeared before us, and as
19 I say, I will advise other participants as early as
20 possible. In that case, of course, Dr. Lent would
21 want to return and partake in that interchange and
22 for that reason --

23 THE COMMISSIONER: That's
24 excellent if Dr. Lent could be persuaded to return
25 again in January, that would be very fine and we
26 certainly appreciate that, doctor.

27 MR. MARSHALL: Mr. Commissioner,
28 I guess it's the hour but I don't quite understand what
29 is intended. Is Mr. Anthony himself going to present
30 a caribou panel to debate among themselves the issues
involving caribou?

1 THE COMMISSIONER: As I
2 understand it he is saying that we won't finish
3 Dr. Lent's evidence today, so he will be bringing
4 back Dr. Lent and Dr. Calef and one or two others to
5 continue with this caribou panel on January the 12th,
6 or whenever it is.

7 MR. MARSHALL: We are
8 going to have some fresh evidence then from the other
9 people that he intends to call?

10 THE COMMISSIONER: Presumably
11 and the suggestion Mr. Anthony made was that since
12 Dr. McTaggart-Cowan will be here to be cross-examined
13 as a member of the Environment Protection Board and
14 presumably Mr. Jakimchuk may well be back as well,
15 that we might consider then having that bear pit or
16 whatever you want to call it, but let's not try to
17 sort that out now. We will worry about that when the
18 time comes.

19 MR. MARSHALL: Yes, there
20 are a number of factors that I would like to
21 consider relating to that. Several people that might
22 want to perhaps participate in the event such an
23 event were to take place --

24 THE COMMISSIONER: Well, I
25 would think, Mr. Marshall, that our chief job will
26 be to get through Mr. Anthony's panel, the cross-
27 examination of the Environment Protection Board and
28 any rebuttal that you might have and any evidence
29 Mr. Scott might have and I think it unlikely that we'd
30 have enough time to do that, but if we do then we can

1 consider it --

2 MR. MARSHALL: Fine, sir.

3 MR. ANTHONY: Now, I will
4 proceed with our panel and if everyone is here and the
5 time is there I would hope that we would have the
6 opportunity to please explore that possibility.

7 GEORGE WALLER CALEF,
8 PETER CHARLES LENT, resumed:

9 DIRECT EXAMINATION BY MR. ANTHONY (CONTINUED):

10 Q Dr. Lent, yesterday
11 afternoon you started your evidence in chief before
12 this Inquiry and explained some of the work that went
13 on in Alaska and in particular with pipeline simulation.
14 I wonder if you would continue then and indicate what
15 you feel this Inquiry can learn from the Alaska
16 experience?

17 WITNESS LENT: Yes, I feel
18 that there is a great deal to be learned from that,
19 not only regarding caribou, but I will also touch on
20 some subjects relating to other wildlife species.

21 THE COMMISSIONER: Dr. Lent,
22 could you move the microphone a little closer to you
23 and make it a little easier for me to hear you, anyway.

24 A In the testimony I gave
25 yesterday I alluded to the problems of unrealistic
26 construction schedules. Alyeska Pipeline Service
27 Company has --

28 THE COMMISSIONER: This is
29 at page 11 of your testimony?

30 A Yes, that is correct.

Calef, Lent
In Chief

THE COMMISSIONER: Right.

A Alyeska Pipeline Service Company has openly admitted that the efficiency of winter construction in particular is far lower than they had anticipated. This slippage has had two types of undesirable effects. The results of tests often being carried out in other than the optimum time for minimal environmental impact and two, it results in pressure to ignore stipulations in order to get operations back on schedule. This results in compromises being made because of pressures on field personnel. Now, yesterday I said that I was going to develop this point further than what was in the prepared testimony with some materials which were not available to me until very recently. So I now will proceed to do that.

In regard to this topic of delays and their environmental consequences I want to read some selections from two documents. The first of these is entitled, "Assessment of Project Status: Trans-Alaska Pipeline." It is by Charles Champion, State Pipeline Co-ordinator for the State of Alaska and dated February 6, 1975.

The second document is a report entitled, "An Analysis of Environmental Stipulation Compliance on the Trans-Alaska Pipeline." This is by Allen Carson and is dated September 10, 1975. What I would like to do is read some, I hope, relatively brief quotations from these two documents.

MR. ANTHONY: Before Dr.

Calef, Lent
In Chief

1 Lent carries on, perhaps I could tell the Inquiry
2 both these reports have been tabled and given exhibit
3 numbers. The Carson report unfortunately is a very
4 poor copy and I hope to provide a better copy for the
5 participants at a later stage, but in any event they
6 will both be left here as exhibits.

7 THE COMMISSIONER: Right.

8 A And I might also add
9 there that there are in these two documents a lot
10 of material relevant to fisheries problems, this sort
11 of thing that you have been talking about with the
12 previous panel.

13 Quoting first of all from
14 the Champion report of February 6, '75, page 4:

15 "Our observations to date indicate that
16 Alyeska and its contractors were in many ways
17 not prepared to deal with Alaska's harsh
18 environment. Adequate pre-planning has not
19 always been apparent. "

20 Page 5, a similar comment:

21 "Alyeska's planning and scheduling often
22 appear to be unrealistically optimistic as
23 evidenced by frequent re-submittals,
24 adjustments of construction schedules and
25 updating of notice to proceed back up
26 data."

27 Page 10, again:

28 "Alyeska's overly optimistic planning and
29 scheduling or lack of foresight is most noted
30 by field and office personnel who are constantly

Calef, Lent
In Chief

1 pressed to process and issue notices to
2 proceed. The justification for haste
3 has nearly always been that the execution
4 contractor is on the site and ready to
5 begin operations. Further, many crash
6 program efforts have been confused by
7 Alyeska notice to proceed applications.

This generates confusion and wasted effort in trying to sort out what the application actually requests. The end result is additional and unnecessary time delays."

"Right-of-way construction was significantly delayed in many instances due to a lack of understanding of Arctic engineering principles or merely the time required for so many federal and state personnel to review the notice to proceed applications. As right-of-way construction is necessarily the first activity, delay of this part of the work virtually stops the entire project."

"The biologists and Alyeska both realize the timing slippage may be encountered and that the plans as formulated may not be operable. The biologists are prepared to accept the fact,"

"accept the fact that construction may take place at critical times and that they will have to call on their expertise to alleviate or mitigate possible damage."

"Analysis of Environmental Stipulation
Compliance on the Trans-Alaska Oil Pipeline,"

and this is the one by Mr. Carson dated September 10/75.

Calef & Lent
In Chief

1 I want to read first of all from page 14 and read
2 No. 2 of his conclusions to this report.

3 "A.P.S.C.,"

4 that is Alyeska Pipeline Service Company,

5 "has not minimized the environmental impact
6 of pipeline construction as required by the
7 stipulations of the right-of-way lease. The
8 most obvious shortcomings of A.P.S.C. is
9 lack of erosion control and rehabilitation
10 efforts integrated with construction to mini-
11 mize the extent and duration of erosion. It
12 should be pointed out that this project does
13 require construction with more stringent
14 environmental safeguards than most projects.
15 It appears many of the environmental problems
16 stem from a lack of knowledge on the part of
17 the people actually doing the constructing.
18 However, it should also be mentioned that the
19 technology for erosion control and rehabilita-
20 tion are available. It's a matter of bringing
21 the necessary manpower and resources to bear
22 to do the job."

23 Now I want to read the recommendations in the Carson
24 Report -- sorry I don't have the page number and that,
25 but it's the final part of the report.

26 "Recommendations.

27 Based on experiences with the Trans-Alaska
28 Oil Pipeline several recommendations will be
29 made. The applicability of environmental
30 circumstances and situations found on the

Calef & Lent
In Chief

1 Trans-Alaska Oil Pipeline can be expected
2 to be very similar to those that will be
3 experienced on a gas pipeline."

4 And if I can depart from the quote for a second, I
5 think that is emphasizing that these recommendations
6 were essentially, with the possibility in mind that
7 a gas pipeline would be built through Alaska on one
8 or another route. Proceeding with the quote and the
9 first recommendation:

10 "Beware of assurances that certain construction
11 practices which will be -- will be used which
12 are environmentally less damaging than usual
13 construction practices. Examples include use
14 of ice or snow roads and assurances that a
15 chilled gas line can be buried in all soils along
16 the route. Many times these claims will be
17 made with inadequate information. After approval
18 for the project is given, the constructor cannot
19 operate as planned and would be forced to ask
20 for a variance, and the government may be
21 forced to allow a construction practice which
22 is not environmentally acceptable."

23 , MR. CARTER: Sir, can I just
24 say at this time that it seems to me an unusual way of
25 putting in someone else's evidence to read from this
26 report and comment on the ability to construct a gas
27 line, without any opportunity to see the person who is
28 making these statements, nor to question him on it.

29 THE COMMISSIONER: Well, Dr.
30 Lent said that he's going to offer us his views, and

Calef & Lent
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1 he was citing the views of Mr. Champion, who is the
2 head of the State of Alaska's Enforcement Office, with
3 jurisdiction over the state-owned part of the pipeline
4 right-of-way, and I think that he may well be a witness
5 in due course, but I think -- Mr. Carson, I don't know,
6 but at least I don't know who he is -- but I think:
7 we'll just have to carry on and if Mr. Champion and
8 Mr. Carson never do appear in the flesh, then the
9 weight to be given the excerpts from their reports
10 remains to be determined. I think we'll carry on,
11 and let Dr. Lent present his testimony in his own
12 way. Carry on, sir.

13 A Yes, thank you. Mr.
14 Carson is now the supervisor of the state part of the
15 JAFWAT -- that is the joint Fish & Wildlife
16 Advisory Team. I'm not quite sure where I left off.
17 No. 2 of the recommendations then.

18 Q You were saying something
19 like, "Beware of snow roads and a chilled gas pipeline."
20 That covers a lot of territory and -- but anyway carry
21 on from there.

22 A All right, I'll start
23 with recommendation No. 2.

24 "Get full-time fish and game resource, JAFWAT.
25 type input into early planning stages of a
26 gas pipeline, this is critical to ensure things
27 like the pipeline alignment are environmentally
28 sound. Also early stage planning can prevent
29 situations where the contractor will not have
30 the right equipment to do a job with the least

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In Chief

1 environmental impact. Examples include the
2 total absence of bridges to cross streams,
3 lack of drag lines or backhoes for deep
4 baling of gravel as opposed to scalping
5 gravel from stream flood plains."

6 I will read now recommendation No. 5:

7 "Beware of tight construction schedules which
8 call for completion of ^{the} project in a two to
9 three-year period of time. These schedules are
10 always optimized and when things go wrong the
11 first place to make up for lost time is by
12 cutting corners environmentally."

13 Recommendation 6:

14 "Request the inclusion of fish and game
15 biologists as the government's representative
16 at the field level. There are several JAFWAT
17 biologists who, with competent engineering
18 technical support, could do an excellent job
19 in this role."

20 Recommendation No. 7.

21 THE COMMISSIONER: Here in
22 Canada you mean?

23 A Pardon? These recommen-
24 dations are with regard to a gas pipeline.

25 Q Mr. Carson is making
26 recommendations with regard to the Alyeska line in
27 this passage you're reading from.

28 A Not to the Alyeska line,
29 recommendations for a future gas pipeline within
30 Alaska.

1 Q I see.

2 A I should say he is assuming
3 that the present JAFWAT effort, or its equivalent would
4 also be in existence with regard to that line.

5 THE COMMISSIONER: Okay, I am
6 with you.

7 A "Seven, include a
8 fishery engineer on the JAFWAT staff. These people
9 are invaluable in being able to communicate with and
10 interpret the language of pipeline builders.

11 Eight, "all habitat affected
12 by construction should be evaluated in terms of
13 value to fish and wildlife resources before construction.
14 An evaluation team should be comprised of biologists
15 from the state and federal land management agencies,
16 the fish and wildlife managing agencies, and the
17 contractor. Mitigation measures and procedures should
18 be established and identified before construction."

19 Number nine, "fish and wildlife
20 surveillance biologists should have a degree of
21 authority to halt construction when stipulation
22 violations are leading to environmental damage. "

23 That is the end of the
24 quote and I would like to say that I think this
25 ninth recommendation which I just read is one of the
26 most important ones, and I will come to that again in
27 a minute.

28 Now, I would like to
29 proceed with a few personal observations relating again
30 to the question of delays in construction schedules.

We've seen in Alaska in the work to date on the Trans-Alaska Pipeline that the progress on revegetation has been particularly far behind schedule. Some areas were revegetated so late this summer that the success of these efforts is definitely open to question. Another example which I would like to cite, because it represents something which has been discussed in testimony before this Inquiry is the case of a worst possible event, and I refer particularly to the unusual ice conditions which occurred this summer off the Arctic coast of Alaska causing serious problems including failure of many barges to reach Prudhoe Bay. This I understand was predicted to be a one in fifty year event, that is the likelihood of these ice conditions occurring, one in fifty, and yet it did occur this summer. As a result, costs of construction, transportation were increased by several million dollars and barges were stranded at various places along the route. I presume that this may be causing some delays in construction, particularly in the oil field. In addition, it led to a request from industry to construct at Prudhoe Bay a 5,000 foot gravel causeway extending out from west of the delta, the Sagavanirtoq River, so that barges which were locked in the ice could be unloaded. This again is an example of a worst possible case which came true and has resulted, at least, in potential for environmental damage because of the construction of the causeway.

Now, I shall return to the

Calef, Lent
In Chief

1 prepared testimony on page twelve, and turning now
2 to another problem.

3 Contractors have preferred to
4 work with long lengths of open ditching (often
5 several miles) with pipe lying adjacent to it.
6 The combination of rows of heaped soil, open ditch and
7 welded pipe segments represents a total barrier. I
8 have not seen, for example, any plans for the possibi-
9 lity that muskoxen will encounter the Arctic Gas
10 Prime Route in the Arctic National Wildlife Range during
11 the construction phase, even though this Route crosses
12 three areas known to be used by muskoxen during the winter
13 and spring. If long ditching is absolutely necessary,
14 then soft plugs (refilled contents) and breaks in the
15 pipe string at plug points should be required.

16 Initial surveillance of
17 caribou along the northern portion of the Trans-Alaskan
18 Pipeline system has shown great seasonal and sex
19 differentials in animals encountering the pipe and
20 associated haul road. Greatest avoidance has occurred
21 during the calving and post-calving period, least
22 during the insect season. However, even during the
23 insect season, cows with calves have not encountered the
24 corridor. At all seasons adult males are sighted on the
25 corridor in greater proportion than would be expected
26 from their numbers in the population. Bergerude has
27 also reported a greater sensitivity of cows to
28 disturbance.

29 Revegetated areas on the
30 right-of-way, the gravel removal pits, and camp

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1 construction sites frequently attract caribou (mainly ,
2 bulls), moose and even bears. This is not necessarily
3 desirable as it brings these species into close contact
4 with personnel and incresases chances for vehicle-
5 wildlife collisions. There have been reports of
6 caribou, Arctic foxes, wolves and bears being killed
7 by vehicles in the course of construction.

8 I might add here that a
9 revegetated gas pipeline berm on the North Slope would
10 undoubtedly attract animals in summer because of the
11 accommodation not only of the green growth, but also
12 because of the insect relief provided by such a berm
13 in line with what I was saying yesterday about the
14 use of berms and elevated road pads in Prudhoe Bay.

15 A major and to date somewhat
16 insurmountable problem in enforcement of environmental
17 standards and stipulations is accountability. A
18 project of this magnitude inevitably results in a
19 dispersal of decision-making powers. We must deal not
20 only with contractors and sub-contractors, but a
21 variety of truckers, aircraft operators and their
22 personnel. Extremely rapid turnover of personnel
23 has characterized the operations in Alaska. The chain
24 of command in the surveillance bureaucracy must be
25 meshed with the exceedingly complex organizational
26 structure in industry. Day to day decisions on
27 interpretations of environmental stipulations are
28 necessary. In the Alaskan situation, the fish and
29 wildlife biologists in the field have all too often
30 not been able to deal rapidly and directly enough to

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In Chief

1 stop a problem in time. Their role has been primarily
2 an advisory one. Field personnel with biological
3 expertise need the authority to stop environmental
4 degradation on the spot. At the same time, all
5 parties need stipulations that are clear and precise
6 enough to minimize delays caused by indecision or person-
7 al biases of the surveillance personnel.

8 The environmental briefings
9 and education in Alaska, that is, have been a travesty.
10 This should not be left entirely to industry. Part of
11 the problem, of course, is due to the high turnover
12 of personnel. Very careful consideration should be
13 given to this phase of the Environmental Protection
14 Program.

Calef & Lent
In Chief

1 All personnel, even those
2 supporting construction through provision of transporta-
3 tion services, should undergo briefings. A related
4 problem and one that has been difficult to obtain con-
5 crete information on, is the termination of employees
6 who report environmental insults to surveillance or
7 agency personnel. Very strong safeguards are necessary
8 to protect such employees.

9 The stipulations and the
10 surveillance and enforcement systems devised for
11 TAPS have been especially ineffectual in dealing with
12 garbage and trash that attracts wildlife and the pro-
13 blems associated with deliberate feeding of bears, wol-
14 ves and foxes. Attractions of wildlife has resulted
15 in numerous incidents including destruction of property
16 (helicopters and other vehicles), expenditure of funds
17 and effort to remove problem animals, deliberate
18 destruction of problem animals, and vehicle collisions
19 with animals that have become unwary.

20 Now at this time I'd like to
21 stop and show a few slides of events in Alaska in the
22 last year or two, particularly relating to wildlife
23 impacts of TAPS construction.

24 This is a scene at Prudhoe
25 Bay, one of the great mistakes made in Alaska, I believe
26 is that the oil field -- that is the unit operation at
27 Prudhoe Bay -- was not included within the area of
28 responsibility of the JAFWAT surveillance team, and
29 this was the type of habitat degradation which has
30 resulted.

Calef & Lent
In Chief

1 THE COMMISSIONER: Excuse me.
2 What are we looking at? Are those tracks?

3 A Yes, those are tracks,
4 yes, made at the wrong time of year and you're looking
5 at an elevated roadway which is part of the Prudhoe
6 Bay system, that's the dark band.

7 Next one. Now I haven't to
8 date seen any reference to air pollution problems in
9 the proceedings of the Inquiry. I presume that subject
10 will be dealt with. This is again burning off at
11 Prudhoe Bay, and I think this will be of particular
12 concern to you with regard to your Mackenzie Delta
13 area and the developments in that area.

14 Next one. This is just a haze
15 also resulting from -- in this case not from Prudhoe
16 Bay, but from one of the construction camps.

17 Next one. Again the results
18 of from in this case the Atigun Canyon Camp in the
19 Brooks Range. Now in spite of very precise stipulations
20 dealing with solid waste disposal, again I come back to
21 problems of enforcement. This scene is near the Franklin
22 Bluff Camp, that is the first construction camp south
23 of Prudhoe Bay.

24 Next one. This shows just some
25 of the litter on the tundra farther from the camp. Of
26 course a certain amount of this is, I presume, inevitable
27 with construction activities, particularly in winter
28 taking place under frequently strong wind conditions
29 which tends to blow material hither and yon.

30 Next one. Again another scene

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In Chief

1 of styrofoam panels that have been blown some distance
2 from the construction site.

3 Next. This is an Arctic fox
4 on a construction pad at one of the camps feeding on
5 some lunch or other food material left out there.

6 Next one. This is another
7 Arctic fox mooching around in a garbage dump at Prudhoe
8 Bay. Again I should say that the environmental stipula-
9 tions regarding camps do not apply to the oil field
10 at Prudhoe Bay, and in general I have the impression
11 from visiting most of these sites that a problem of
12 garbage, garbage disposal is much greater within the
13 oil field, the unit operators area than along the
14 pipeline corridor.

15 Next one. These are two
16 I guess we could say tame wolves along the haul road
17 associated with the TAPS corridor. In a minute we'll
18 see why they look so well-fed.

19 Next one. This is a worker
20 tossing some excess lunch, I guess, to a wolf. One of
21 the problems, to talk a little about the enforcement
22 problems here, there has been very little attempt to
23 bring criminal charges against such personnel. Whenever
24 action has been taken, which I think has been relatively
25 infrequent, it results simply in their being fired and
26 dismissed, in which case they appear in the Union Hall
27 a few days later and then very shortly get re-hired.
28 So the whole problem of enforcement of this type of
29 -- in preventing this type of activity is a very
30 difficult one. In fact, another problem is that

Calef & Lent
In Chief

1 personnel such as this one, a sub-contractor of some
2 sort, a trucker, is not required to identify himself
3 to JAFWAT surveillance advisory team, he is not required
4 to have for example an identification badge of any
5 sort.

6 Next one, please. Next one.

7 Now that is not a large Texan with a fur parka in the
8 foreground, it's a grizzly and again you can see how
9 tame they have become in certain areas. To date
10 we've been very fortunate there have been no serious
11 injuries or deaths to pipeline workers, however the
12 bears and the wolves have not been so fortunate. There
13 have been several cases where particularly the black
14 bears have been destroyed as problem bears, grizzlies
15 mainly have been moved out, and also of course several
16 of these animals have been struck by vehicles because
17 once they look upon a vehicle as a source of food,
18 they naturally lose whatever fear of vehicles they
19 might have had previously. In fact one grizzly bear
20 had learned to go through the buses used to transport
21 pipeline personnel to construction sites at night for-
22 aging.

23 Next one. Similar scene of
24 illegal feeding of bears.

25 Next one. Again getting
26 closer.

27 Next one. Now the next
28 ones we'll just run through quickly, just a few slides
29 of mortality of animals along the haul road.

30 Next, caribou.

Calef & Lent
In Chief

1 Next, red fox. This is an
2 elevated section of the pipeline. This wasn't my
3 slide, I'm not even quite sure where this was taken.
4 I had hoped to have one to show the elevated animal
5 crossings which, as I mentioned yesterday, are required
6 to have a minimum clearance of ten feet. This clearance
7 there looks like it's a bit less, but this will give
8 you a general idea of what it looks like.

9 Next one, please. Now I
10 just threw this in at the end, for perhaps, for your
11 entertainment. This is not our pipeline simulation.
12 This is rather the elevated gas line in Siberia which
13 comes into Norilsk, and it does show their caribou
14 crossing facility, that is the elevated section in the
15 background. Of course it is a smaller diameter line.
16 There have been, of course, problems with their
17 reindeer herd being trapped in between two parallel
18 pipelines and actually entering the City of Norilsk,
19 as a result, to date, I haven't seen any hard data on
20 how successful these crossings have -- these elevated
21 crossing facilities have been but we just have heard
22 by word of mouth they have been used at least by sig-
23 nificant numbers of animals.

24 I believe that's all the
25 slides.
26
27
28
29
30

1 THE COMMISSIONER: What is
2 the height of the crossing that we just saw in
3 Siberia?

4 A Pardon?

5 THE COMMISSIONER: What is
6 the height of the crossing in the last slide?

7 A That wasn't actually
8 my slide and I don't have the exact figures. It
9 was, I believe, about 24 feet inch diameter and it
10 looked that it must be about 25 feet up.

11 MR. ANTHONY: Mr. Lent,
12 would you perhaps now provide the Inquiry with a bit
13 of a historical perspective indicating the impact
14 on caribou in Alaska?

15 A Yes. All caribou pop-
16 ulations that are in contact with the settled portions
17 of the State and its route system are in a general
18 state of decline. This decline is also occurring in
19 the Mount McKinley National Park herd which calves near
20 the park road which is protected from hunting in that
21 area. I want to refer specifically to the Steese 40-
22 Mile sub-popultion because of this international
23 herd has been the subject of previous testimony at
24 this Inquiry, and I know that Dr. Calef also will be
25 speaking on that herd.

26 There is no doubt that this
27 herd was at one time the largest west of the Mackenzie,
28 larger than any herd existing in North America today
29 and probably numbering in the hundreds of thousands.
30 At present it numbers under 10,000. As late as the

Galef, Lent
in Chief

1 1920's or so, caribou would come into the area where
2 Fairbanks is today. Early University regulations had
3 admonitions against shooting moose and caribou on
4 campus.

5 THE COMMISSIONER: Excuse me,
6 the University, you mean the University in Fairbanks?

7 A Yes, that is correct.

8 THE COMMISSIONER: And that
9 was the major institution in Fairbanks in the '20's ,
10 was it?

11 A Yes, essentially so,
12 I was referring to the fact that the University
13 catalogue, the calendar of the University, is what
14 I meant --

15 THE COMMISSIONER: Oh, yes,
16 I understand that.

17 A I cannot imagine that
18 there is much likelihood of caribou ever appearing
19 there again. Since 1950 or so we have seen a
20 gradual shift in the calving grounds of the Steese-
21 40-Mile herd. In the early '50's a major portion of
22 the calving segment crossed the Steese Highway to
23 calve on the northwest side. Gradually the calving
24 area retreated to the southeast until it reached
25 the present situation where all animals calve on the
26 same side as they winter on and only a few animals
27 later move on to the summer range on the opposite
28 side of the highway.

29 We know that two major
30 and permanent exoduses of animals occurred from the

Calef, Lent
in Chief

1 Steese-40-Mile herd during the period when the calving
2 grounds were shifting. We can only speculate as
3 to whether these events were related in any way.
4 Another tiny fragment of this once massive herd
5 has settled in the area of the Delta River, where it
6 is relatively sedentary and shows ^{low} productivity.

7 The much reduced Nelchina
8 population, and you recall from when we showed the
9 map yesterday, that that is the one through which
10 the Trans-Alaskan Pipeline corridor passes, the
11 much reduced Nelchina population has frequently
12 and with some regularity moved across the Richardson
13 Highway to winter ranges to the east. This is the only
14 regular crossing of a heavily used highway currently
15 occurring in Alaska. I, for one, doubt if the crossings
16 will continue once the animals are confronted with the
17 oil pipeline paralleling this highway.

18 I have already mentioned the
19 total disruption of the Seward Peninsula-Yukon
20 Delta caribou herd in the nineteenth century, apparently
21 as a result of over harvest on calving and post-
22 calving areas. Tiny fragments of this herd have also
23 persisted but have never expanded to former abundance.
24 The question to be raised is this, are events such as I
25 have described to be the fate of all our migratory pop-
26 ulations?

27 For the sake of completeness
28 I must mention the small reintroduced caribou on the
29 Kenai Peninsula, that is a small population, not
30 necessarily small caribou, on the Kenai Peninsula.

Calef, Lent
In Chief

1 These animals have frequently wandered into towns,
2 on to airstrips, etc., in the wintertime. I consider
3 this a rather special case of a new population still
4 exploring its environment, and again I want to
5 emphasize that these contacts are primarily in winter.

6 Although the evidence is
7 meagre, we must consider the possibility that caribou
8 are less likely to prevail in the face of barriers or
9 contacts during pre-calving, calving, and summer periods.
10 Most of the information on disturbance and barrier
11 effects, such as that described by Bergerude (1974),
12 Klein, Miller, Jonkel and others, deals primarily
13 with winter events. Villmo, a Norwegian, does state that
14 developments in Scandinavia have had greater effect
15 when they involve calving areas and similar critical
16 ranges.

17 We cannot, of course,
18 isolate fully the causative factors in these cases,
19 man-made from natural, hunting from disturbance or
20 barrier effects. To be sure, we cannot even be certain
21 what are the causes and what are the effects, in some
22 cases. Nevertheless, the circumstantial evidence is not
23 encouraging. At present there are only two major caribou
24 sub-populations west of the Mackenzie that can be
25 said to be thriving: the Alaska Peninsula and the
26 Porcupine sub-population. Both are wilderness
27 populations and both, at least until relatively
28 recently, were unaffected by heavy hunting or roads.

29 I hope you will understand
30 why many of us in Alaska find it difficult to accept

Calef, Lent
in Chief

1 Dr. Bergerude's thesis based on his extensive work
2 in Newfoundland, that caribou are adaptable to human
3 disturbance and pressures, and I am referring to
4 material which was quoted, I believe by Mr. Jakimchuk
5 appearing in volume 89 of the testimony, pages
6 13484 to 13486.

7 The evidence from Scandinavia
8 and the U.S.S.R. and the long-term picture in Alaska
9 suggests otherwise. To me, the migratory barren-
10 ground caribou of North America, even more than the
11 wolf with which it has co-evolved, is a wilderness
12 species. The Porcupine caribou herd represents one
13 of our few remaining opportunities to maintain a migrato-
14 ry group in a wilderness setting.

15 MR. ANTHONY: Dr. Lent,
16 would you provide this Inquiry with your evaluation
17 of the proposed Arctic Gas Prime Route and other
18 available alternatives to move gas from Alaska?

19 A Yes, I would like
20 to sum up why I believe the Arctic Gas Prime Route
21 is environmentally unacceptable.

22 The Arctic coastal tundra
23 in the Arctic National Wildlife Range represents
24 slightly under 12% of that in Alaska and, therefore,
25 in the United States. It is the only such tundra
26 area in the United States in protected status. It is
27 the only such tundra area in the United States with
28 any reasonable possibility for wilderness designation
29 by the U.S. Congress. It is the only area where one
30 can proceed from Arctic ocean to Arctic alpine areas
in such a short distance. It has the potential for

1 a magnificent international protected area.

2 Finally, it contains the
3 only calving area for a major herd that lies in a
4 national park refuge or similarly protected area
5 except for the small McKinley herd which does calve
6 in Mount McKinley National Park. Certainly it is the
7 only major calving grounds protected in Alaska and
8 to the best of my knowledge it is the only one in
9 North America. For all of the above reasons, the nor-
10 thern portion of the Arctic National Wildlife Range
11 must be considered unique and irreplaceable. Any in-
12 dustrial exploitation must be avoided because of the
13 inevitable undesirable impacts on the aesthetics,
14 scientific and wilderness values.

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Calef & Lent
In Chief

1 What alternatives then should
2 we examine? The Fairbanks route has, from the Alaskan-
3 U.S. viewpoint, certain great environmental advantages.
4 To put it bluntly, it is already mucked up. For
5 example, the camps necessary for construction are
6 already there, at least as far as Delta Junction on the
7 Alaska Highway. Beyond that there are already settlements
8 and roads.

9 With regard to caribou speci-
10 fically, the environmental impacts would be exceedingly
11 small in comparison to any other alternate route.
12 On the northern part of the Fairbanks route we now
13 seem to be dealing with a small, perhaps two to 3,000
14 central Arctic sub-population which is moving
15 parallel to the existing right-of-way, calving east
16 of Prudhoe Bay and to a large degree remaining in the
17 Brooks Range or to the north during the winter. A
18 gas pipeline parallel to TAPS to Delta Junction and
19 then proceeding down the Alaska Highway would not
20 impact on any other caribou.

21 In summary, with regard to
22 impacts on caribou and on other wildlife or wildland
23 values, the Fairbanks route is vastly preferable.
24 I cannot help but say, however, that use of this route
25 would impact unfavorably on the human population of
26 Fairbanks. On the other hand, our quality of life
27 there has already deteriorated markedly. Perhaps we
28 do not have much more to lose.

29 THE COMMISSIONER: Could I
30 just ask you a question? We're going onto Dr. Calef

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1 now, are we? Just before I forget it, at page 17
2 near the bottom of the page you said that "the Arctic
3 National Wildlife Range is the only tundra area in the
4 U.S. in protected status, and with any reasonable
5 possibility for wilderness designation by the U.S.
6 Congress." We've been through your Statutes and so
7 forth. Now, Dr. Banfield said that the United States
8 had designated a park area called Gates of the Arctic
9 in North-west Alaska. I don't know whether you read
10 his testimony on that --

11 A In fact I have it right
12 here.

13 Q Could you comment on that
14 before we go onto Dr. Calef?

15 A Yes. The Gates of the
16 Arctic proposal does not have in it any coastal tundra.
17 It is primarily a mountainous foothill park. I very
18 much hope it is established. I think there's a good
19 likelihood of it being established. But it does not
20 have in it any coastal Arctic tundra.

21 Q Does it constitute the
22 habitat of what I think you called the Arctic herd,
23 the Western Arctic herd?

24 A Yes, it includes peripher-
25 al range, some winter range. It is certainly used by
26 that Arctic herd, but I wouldn't consider it the most
27 important part. Of course it does not include the
28 calving grounds and post-calving area.

29 Q That herd, their calving
30 grounds and post-calving area are on the coast, I take

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In Chief

1 it.

2 A You're referring to the
3 Arctic herd?

4 Q Yes.

5 A The Arctic herd calving
6 Naval
7 grounds lies in/Petroleum Reserve No. 4. Perhaps
8 it would be helpful to just sort of run briefly through
9 the sort of status of areas on the Arctic coast with
10 you?

11 Q Well, we might as well
12 if you people don't mind, because this is important.

13 A Yes.

14 Q Just let me make a note
15 of what you said there. What do you call that herd,
16 the Western Arctic herd?

17 A We in Alaska rather
18 provincially just refer to it as the Arctic herd.
19 Sometimes it's called the north-western herd.

20 Q Yes. Right, well carry
21 on then.

22 A O.K. I said in my
23 testimony approximately, and this is just my own rough
24 estimate, 12% of the tundra, Arctic tundra of Alaska
25 and therefore the U.S. lies in protected status in
26 the Arctic National Wildlife Range. To the west of that,
27 of course, we have state land, the Prudhoe Bay oil
28 field and some other areas which are mostly already
29 leased out, at any rate state land with no particular
30 protected status. Then we hit the major portion of the
Arctic tundra in Alaska, west of the Colville River,

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1 which lies in petroleum reserve No. 4, which of course --
2 where of course exploration is now going on, and where
3 there is, I presume it's safe to say a great likelihood
4 that there will be development of oil and gas resources
5 in the future. There is, at the present time, no protected
6 status for any portion of that petroleum reserve. To
7 the west of that we have another area where, from my
8 limited knowledge, I believe has some oil and gas
9 potential. Most of that land has been selected by native
10 village or regional corporations as a result of the
11 Alaska Native Claims Settlement Act and of course that
12 then becomes private property and they are free to
13 develop it as they wish. That's a rather checker-
14 board affair there, but there will be some land
15 reverting to the public domain of the Federal Government.
16 But as I say it's mainly a checkered up sub-division.

17 Q Yes, I've seen the land
18 selection plans.

19 A Yes.

20 Q Quite interesting, it
21 doesn't take migratory routes into account.

22 A That essentially then is
23 the status of the Arctic portion of tundra in Alaska.
24 Now of course there are other areas in Alaska which have
25 tundra, and in fact I believe in Dr. Banfield's testimony
26 he made some statement about, "We've got tundra in
27 Alaska going all the way down to Bristol Bay." Well, I
28 think this is very misleading because the whole physio-
29 graphy, the whole vegetation, faunal composition of
30 these south-western tundra areas is very different

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1 from that of the North Slope of Alaska.

2 THE COMMISSIONER: Yes, thank
3 you. Maybe if it's not asking too much at lunch time
4 you might just scribble out on a piece of paper a little
5 map of those areas, without trying to be scientific or
6 anything about it.

7 A Yes, perhaps we could
8 stick that slide back in that I showed yesterday.

9 Q Yes.

10 A I'm not much of a map
11 maker.

12 THE COMMISSIONER: Well, all-
13 right, well onto Dr. Calef.

14 MR. ANTHONY: Yes, Mr.
15 Commissioner. Before Dr. Calef commences, it may
16 assist counsel and others who are following the evidence
17 to have before them the Arctic Gas evidence that was
18 led, and particularly pages 17, 18 and 19 of the
19 prepared evidence. I have photocopied those pages and
20 provided you a copy.

21 THE COMMISSIONER: Mr. Jakim-
22 chuk's comparison of the coastal route and the interior
23 route?

24 MR. ANTHONY: Yes, and Dr. Calef
25 will be referring to that table, and as well on the
26 last page of Dr. Calef's prepared evidence he has a table
27 which will also be referred to, and I believe also there
28 is a graph taken from one of the Arctic Gas reports
29 which I have also photocopied and made available which
30 may be referred to in the text.

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1 THE COMMISSIONER: All right.
2 Well, before we start with Dr. Calef, perhaps we should
3 take a break. Let's not push ourselves too hard this
4 morning.

5 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

6 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

7 THE COMMISSIONER: Well, we'll
8 start again.

9 MR. ANTHONY: Mr. Commissioner,
10 from another report we've photocopied sections indicating
11 the various locations of the Alaska herd, and I've
12 distributed that to counsel and to yourself. I don't
13 know if that need be an exhibit but it can be referred
14 to by counsel if they wish, in cross-examination.

15 THE COMMISSIONER: Fine.

16 MR. ANTHONY: I would now like
17 to turn to Dr. Calef and ask him to make his presenta-
18 tion to the Inquiry.

19 THE COMMISSIONER: Yes, Dr.
20 Calef.

21 WITNESS CALEF: Mr. Commissioner,
22 the questions currently before this Inquiry concern our
23 ability to predict what effects the construction and
24 operation of a gas pipeline might have on the great
25 herds of barren ground caribou. In particular, we
26 would like to know if there is any evidence that the
27 pipeline project would cause the herds to decline, or
28 to alter their use of ranges or migration routes, and
29 whether any one route, one construction schedule, or
30 some set of regulations would result in less impact on

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1 caribou than others. Let me state at the outset my
2 opinions on these questions.

3 I believe first of all that we
4 cannot predict with certainty the effects of this
5 project on the caribou, but that there is reason to
6 believe that there is potential danger of reduction in
7 populations or changes in ranges.

8 Secondly, that some routes
9 are less likely to cause harm than others, and point
10 three, that because of our lack of ability to predict
11 effects, we must err on the side of caution in consider-
12 ing what restrictions and conditions should be placed
13 on the construction and operation of any industrial
14 activity in the north.

15 I thought it might be helpful
16 to you if I could outline exactly what we need to know
17 in order to detect changes in a caribou population.
18 First we would require accurate population estimates.
19 There are techniques now available employing air photos
20 of post-calving aggregations which can give very accurate
21 estimates, but there have not been such reliable methods
22 in the past.

23 Secondly, we must gather knowledge
24 about the patterns of movements and distribution of the
25 herd throughout the year, that is the migrations, and the
26 seasonal use of ranges.

27 Thirdly, we must learn the
28 demographic characteristics of the herd, that is its
29 reproductive rate, survival of calves, and the mortality
30 of all age groups. For the population size of any group

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1 of animals at a given time results from the balance of
2 input, that is reproduction, and output, which is
3 mortality.

4 Finally we must make these
5 studies over a period of years to establish trends,
6 variances in all these figures, and so forth.

7 Now, if a project or a distur-
8 bance confronts the caribou and if the size or distri-
9 bution of the population changes, then we can begin to
10 look for a causal relationship between the disturbance
11 and the decline. It may be direct and obvious, such
12 as a great increase in mortality through hunting, or
13 it might be subtle, such as an increase in predation
14 rate or a decrease in the birth rate when the herd
15 moves to a new range to avoid disturbance.

16 However, the establishment of
17 the cause and effect relationship between a project and
18 a population decline is a most difficult task, requiring
19 detailed understanding of the caribou's biology and
20 an intense study over a period of years. I submit
21 that in no case in the past have we had the detailed
22 censuses, the demographic data, or the accurate knowledge
23 of ranges and movements to establish whether caribou
24 have been affected by a major development or disturbance,
25 and there have been some in the past such as hunting
26 by whalers and prospectors, and construction of highways,
27 railways, and hydroelectric developments.

28 Therefore we are always left
29 with anecdotal evidence for cause and effect, with
30 suggestions that declines might have been caused by

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1 man's activities.

2 First let me substantiate the
3 points about the inadequacy of our data in the past.
4 In 1949 the first population estimates of caribou in
5 Canada's Central Arctic were carried out by Dr. Frank
6 Banfield, who systematically used aircraft for the
7 first time. He estimated the total numbers at 670,000
8 animals, a figure which he theorized represented a
9 drastic decline in numbers of caribou from what had
10 been present in primitive times. He also ascribed the
11 animals to 19 separate herds.

12 In 1955 John Kelsall, who
13 continued the caribou studies for the Canadian Wildlife
14 Service, estimated a total of 278,000 animals and then
15 in 1957-58, he estimated only 200,000 animals.

16 Donald Thomas re-surveyed the
17 area in 1967 and found 387,000 caribou. By this time
18 increased knowledge of distribution and movements indi-
19 cated that all the caribou could be assigned to only
20 four major herds. Had the caribou increased between
21 1957 and 1967 as Kelsall's data compared with Thomas'
22 suggests?

23 Gerald Parker took Kelsall's
24 1955 data and showed that if the same assumptions and
25 calculations were applied to this data, as to Thomas'
26 1967 data, a population estimate of 400,000 results.
27 That's for the year 1955, which if true, shows that
28 there was not an increase between the two estimates.
29 Such uncertainty indicates that even survey data are
30 open to interpretation. No complete survey of the

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1 entire area has been published subsequent to 1967.
2 However, surveys of individual herds have been carried
3 out more recently. For example, Thomas found that the
4 bluenose herd was represented by a mere 19,000 animals
5 in 1967. A few years later it was estimated at 90 to
6 100,000 animals.

7 I submit, therefore, Mr.
8 Commissioner, that this is not the level of accuracy
9 for the continuity of surveys which we require to even
10 detect changes in caribou populations, let alone to
11 attribute them to specific causes. Within the Canadian
12 Wildlife Service, for example, we find one group of
13 biologists who believe that the caribou have declined;
14 another group who think they haven't, both using the
15 same data.

16 The situation in Alaska is
17 similar. In 1920, Olaus J. Murie estimated the 40-mile
18 herd at 568,000 animals by counting segments of the
19 herd which crossed the Steese Highway during migration.
20 Fortunately, he didn't have aircraft available to him
21 when he did his studies. He concluded that the actual
22 population could easily have been one million animals.
23 The 40-mile herd is the great herd of which Dr. Geist
24 spoke in Whitehorse, which ranged over some 100,000
25 square miles. After Murie's studies, there were few
26 further scientific estimates of the herd until the
27 work of Ron Skoog in the early 1950's. He estimated the
28 population at 40,000 animals, and worked out the
29 range and movement patterns of the herd during that
30 period.

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Another lull in studies then occurred until the late 1960's and early '70's, by which time the herd was about 6,000, and had occupied restricted ranges and made smaller movements than it had during Skoog's studies, and of course very much smaller than those made by the huge herd observed by Murie.

The same kind of story characterizes the Nelchina herd. In 1955 it numbered approximately 40,000, rose to 71,000 in 1961, and yet by 1973 only 8,100 animals remained. The buildup from 40,000 to 71,000 was well documented by Skoog, in fact I believe that this is one of the two best documentations of caribou population dynamics that we have. But the decline was inexplicable.

If we look at the demographic parameters of reproduction and survival, we find even more erratic and sketchy data. Parker comments:

"Estimates of the annual kill of caribou from Kaminuriak population were as varied as the estimates of total numbers."

Kelsall said:

"Kill statistics for barren ground caribou have always left much to be desired."

For reproductive rates, some scientists have relied on pregnancy rates from a sample of killed animals. Others recorded live birth rate. Still others have used calf crop in autumn after the summer's mortality has occurred, and some even use the percentage yearlings in the herd the following spring.

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1 Rarely are all four types of measures available for
2 one herd, and almost never over a period of years.
3 As a result, the biological accounting procedures, that
4 is the balancing of births and deaths to predict changes
5 in numbers, could not be accurately done.

6 THE COMMISSIONER: It sounds
7 an awful lot like the calculation of oil and gas reserves.

8 A Yes, I would say so, and
9 this is exactly what the Canadian Wildlife Service was
10 attempting to do for Renewable Resources, estimate the
11 reserves.

12 My purpose in describing
13 these weaknesses is not to denigrate the work of early
14 biologists. Their efforts represent almost heroic,
15 pioneering studies of largely unexplored areas and
16 unknown populations. They have yielded much knowledge
17 and laid the ground work for anything we might do in
18 the future. But I hope that I have indicated that they
19 do not provide us with the equipment that we need to
20 explain the population dynamics of the caribou herds,
21 or to say whether the activities of man have caused
22 some of the purported caribou declines of the past.

23 I think it is worth recalling
24 some of the encounters between caribou and human activ-
25 ity to see if we can find even hints about how caribou
26 react to man's activity, and if there seems to be even
27 circumstantial evidence that declines were caused by
28 human activities.

Perhaps the best place to start is with the 40-Mile herd. It used to roam the Yukon Territory and east central Alaska. We know that in the early part of this century, the herd built up over a period of years to a very large population numbering half a million or perhaps even a million animals according to Dr. Murie. It is interesting to note that the period during which the herd built up to this immense population was a period of very great human activity within its range. The Klondike rush of 1898 brought an estimated 100,000 souls into the Yukon River drainage; an invasion the likes of which has not been seen until recent years. Many of these prospectors and other hangers-on killed caribou for themselves and for their dogs. Market hunting also flourished. Selous reported, for example, that "fifteen hundred caribou were killed by meat hunters during the autumn migration across the upper waters of the Klondike...". Prospecting itself was an activity which involved setting open fires to melt the over-burden; fires which presumably often got out of control. Wood burning steamers plied the rivers also causing fires and disturbing swimming animals during migration.

After the mid-1920's the herd apparently began to not only decrease in size, but also to shift its ranges away from the southeastern parts of the ranges, that is, away from the Whitehorse-Carcross-Skagway region. During the 1930's the herd seemed to be extending its migrations to the north as

1 far north as Fort Yukon. By 1940, caribou were
2 again scarce around Fort Yukon and apparently the pop-
3 ulation declined still further.

4 When Skoog began to study the
5 herd in the early 1950's, there were approximately
6 40,000 caribou remaining and the herd seemed to
7 prosper for several years thereafter. However, in the
8 spring of 1957, following their wintering in the Ogilvie
9 Mountains, north of Dawson, apparently a large number
10 of animals (perhaps as many as 30,000) did not return
11 to Alaska. It is thought that they migrated northward
12 with the animals of the Porcupine herd. We know
13 that throughout this period, the caribou were hunted
14 every autumn as they crossed the Steese Highway from
15 their calving grounds in Alaska to the wintering
16 grounds in Canada. Finally, in the 1960's the herd
17 gradually stopped crossing the highway in the spring
18 and began calving in the area between the Steese
19 Highway and the Taylor highway. In the years following
20 this change in calving grounds, it declined further, until
21 by 1973 only some 6,000 remained. At this point,
22 snowmobile traffic and hunters were also discouraging
23 animals from crossing the Taylor Highway to their
24 normal winter range as well.

25 We must now ask, did the
26 disturbances and hunting which the herd experienced on
27 the Steese Highway cause it to abandon its calving
28 grounds? The answer is, we don't know. If the
29 highway had this effect, it took place over a period
30 of years, for the caribou crossed that highway for over

1 forty years, They were crossing the highway when
2 Dr. Murie first estimated the population in 1920.
3 We do note, however, that once they did stop crossing
4 the highway to calve on their traditional calving
5 grounds, the herd declined quite rapidly, although
6 a detailed description of the decline is not available.
7 Throughout this presentation when I speak of a
8 description of a population decline I mean in
9 demographic terms, was reproduction affected, or was
10 mortality affected, or whatever.

11 Let us now consider the case
12 of the Kaminuriak caribou herd which, at one time,
13 crossed the Hudson Bay Railroad while migrating
14 to winter ranges in northern Manitoba. This railway
15 was constructed during the years 1925 to 1930. At
16 the time that Dr. Banfield began his caribou
17 research in central Canada, he reported that
18 "approximately 75,000 caribou cross the railway tracks
19 annually in migration". At that time, Dr. Banfield
20 estimated the caribou populations in northern Manitoba
21 and Saskatchewan at 120,000 animals. He noted that
22 the "herds cross the tracks during the months of
23 November, December, April and May and suffer some
24 losses." However, "... no signs of excessive mortality
25 along the track were noted." He also observed that
26 "the track influences the behaviour of the migrating
27 bands. Caribou parallel the track for some distance
28 before crossing it in single file and striking off in
29 the direction of travel." We should also note that
30 the railway at this time had a rather low volume of

1 two trains per week; quite different from the sort
2 of proposal which was made recently for an oil carrying
3 railway in which long trains of tank cars would
4 pass each point on the North Slope approximately
5 45 minutes night and day the year round.

6 Sometime duirng the late
7 1950's and early '60's, the caribou stopped
8 crossing the railway and no longer used the ranges
9 south of the Churchill River. The population was
10 estimated at 149,000 animals in 1955 and then not again
11 until 1967 when the herd had apparently declined to
12 63,000 animals, a figure which has been verified
13 several times in recent years.

14 In commenting on this
15 situation, Gerald Parker said, "Banfield ... directed
16 the first study of this population at a time of unusual-
17 ly high total numbers and greatly extended winter range
18 limits." We might note, parenthetically, that this
19 is rather ironic in view of Banfield's conclusion that
20 the caribou had declined drastically and that what
21 we had during that time amounted to a "caribou crisis",
22 a term which he coined. Parker continued, "Historical
23 records suggest the opposite, that the present status
24 of the population closely approaches that which existed
25 in primitive times. Barren ground caribou were seldom
26 known to cross the Churchill River before 1900...". He
27 concluded therefore, "The area utilized by the
28 Kaminuriak population appears to vary with population
29 size. An increase in the Kaminuriak population
30 ... during the late 1940's resulted in greater pene-
tration into the forested winter range."

1 Now, if we agree with Parker
2 and view the situation in this way, then it seems very
3 likely that the Churchill Railway had little to do with
4 the decline of the caribou. Probably it was a
5 natural decline which would have occurred regard-
6 less of the construction and operation of the
7 railway. However, we can compare this
8 with the experience of railways in Scandinavia.

9 In Scandinavia, where semi-
10 domesticated reindeer are an industry, we have
11 much better data on the fortunes of the populations
12 than we do for most of the North American caribou
13 herds. We find evidence that railways and highways are
14 a persistent source of annual mortality to reindeer
15 which runs into the hundreds of animals per
16 year, and seems to be increasing as both the number of
17 miles of road and railway and the traffic levels in-
18 crease.

19 Dr. David Klein of the Uni-
20 versity of Alaska has published information describing
21 the abandonment of ranges by reindeer in
22 Norway, after their migrations were interrupted by rail
23 or highway traffic. He noted that the abandonment
24 took place gradually; that for several years the herds
25 approached the railway but fewer and fewer crossed each
26 year until finally they gave up all further attempts.

27 Finally, I would like to
28 use an example of a more recent and a different type
29 of disturbance to a caribou population; namely, the
30 construction of the Churchill Falls Dam in Labrador.

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Now, I am not relying here on published information but rather on personal communications from Steve Wetmore, a biologist who carried on caribou studies in Labrador for several years. I understand from him that the reservoir behind the Churchill Falls Dam has flooded the traditional calving grounds of one of Labrador's caribou herds. I am sorry, I don't know the name that is given to that herd. Consequently, the caribou have been forced to calve to the south of their normal calving grounds in recent years. Part of his population study of this herd has involved following the survival of calves, and he told me that in the three years following the construction of the dam, the survival rate of the calves of this herd declined progressively each year until now it is substantially lower than previously. He, of course, was not willing to say that the shift from the original calving grounds had resulted in the lower survival, although he did note that the area in which the caribou were forced to calve now had a much higher wolf population than the original calving grounds.

He also noted that there were three other sources of disturbance to caribou connected with this project, and these are the Shefferville Railway, the haul road from the railway to the dam site, and the transmission line from the dam. He observed that the summer distribution of caribou was as far from the three disturbances as could be. That is, the caribou were found in the

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1 center of the triangle formed by the three lines.

2 Whether studies of this
3 population will continue, whether a population decline
4 will be noted as a result of the lower calf survival,
5 and whether it can be attributed to the project
6 remains to be seen.

7 Mr. Commissioner, I hope
8 that these examples that I have given you show that
9 the conclusion that one might draw about the effect
10 of these various projects and human activities on
11 the caribou population virtually depends on whether
12 one is an optimist or a pessimist. I suspect that
13 you will agree that if it came down to a legal case
14 in which one had to prove that the decline of one
15 of these caribou herds could be attributed to
16 human activities, the conclusion would be that there
17 was not enough evidence to establish the cause and
18 effect relationship.

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However, I would like to point out what I believe are a few general lessons that we can learn from these examples. First, it appears that when caribou are driven from their traditional calving grounds the reproductive rate and/or the survival of calves declines. Secondly, that for a disturbance or a barrier to stop or deflect the migration of caribou permanently, it must exert its influence over a period of time. Caribou will try to keep their traditions and will not be discouraged by a single unpleasant encounter.

Third, the likelihood that a disturbance will have an effect depends on its intensity. That is for example, the higher the rate of traffic on a highway, the more likely it is to deter caribou.

Fourth, various disturbance factors seem to add to each other in their effect. Again, a highway provides a good example. The traffic in itself may be an important source of disturbance. Hunting in itself may be an important source of disturbance. The two together in the same place at the same time, that is hunting along a highway, may provide a greater disturbance than either of them by itself and may in fact be a greater disturbance than the sum of the individual disturbances.

Finally, we might note the suggestion of fluctuations in caribou populations and the possibility that population changes might be cyclical over a period of 20 to 50 years. If this were

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1 true, then a disturbance might have quite a different
2 effect depending on whether it took place during a
3 period of increase or a period of decrease. To put
4 this another way, there might be times in which the
5 activity of man would have little effect on the caribou,
6 for example perhaps on the 40-mile herd around Dawson
7 in the 1890's, and other times when disturbance could
8 push a naturally occurring decline to dangerously low
9 levels.

10 With these thoughts in mind,
11 I would like to consider the applicant's analysis
12 of impact potential of the Arctic Gas Pipeline on the
13 Porcupine caribou herd, with respect first to the
14 differences between the coastal route and the interior
15 route, and secondly, with regard to its field experiments
16 on the effects of disturbance on caribou to see whether
17 they really do provide the concrete answers to prediction
18 of caribou responses which the applicant implies.

19 I would like to re-examine the
20 applicant's evidence in support of his conclusion that
21 the coastal route would have less of an impact on the
22 Porcupine caribou population than the so-called interior
23 route. I think that much of the evidence is misleading
24 at least it can be shown that the knowledge of the
25 behaviour and ecology of the herd can lead to quite
26 different conclusions, depending on where the emphasis
27 is laid.

28 Mr. Jakimchuk lists the
29 advantages and disadvantages of the interior route as
30 he sees them in a table. This is on page 17, 18 and 19

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1 of his direct evidence to this Inquiry. I would like
2 to go through his points one by one, stating whether I
3 agree with the arguments or not, and then reconstruct
4 the table to show what I consider to represent the true
5 balance of risks involved in the two routes.

6 Do you have a copy of Mr.
7 Jakimchuk's table? O.K. Then we'll go to point No. 1.
8 I'm reading now point No. 1 under,

9 "Disadvantages."

10 1. "Crosses migratory paths of spring and fall
11 migrations and summer movements."

12 THE COMMISSIONER: This is the
13 disadvantages of the interior route?

14 A That's right.

15 Q All right.

16 A This is according to Mr.
17 Jakimchuk's table. The assertion that the interior
18 route crosses the area of summer movements of any major
19 part of the Porcupine caribou herd is untrue. To my
20 knowledge, the only area in which caribou would encounter
21 the interior route during the summer is in the
22 Canning River Valley. These movements in the past have
23 involved only a few hundred caribou, according to the
24 applicant's data. The Canning River must be considered
25 to be on the very periphery of the range of the distribution
26 of that herd. On the other hand, the remainder
27 of the population involving in many cases up to 115,000
28 animals travels on or near the coastal route during
29 the months of May, June, and part of July. 1 During
30 August the last month that could be considered summer,

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the caribou are distributed approximately equidistant from the two routes.

Point No. 2, under "Disadvantages".

"Year-around activity in Canning River Valley would interfere with movements spring, fall and summer."

Again I would like to note the Canning River is the peripheral part of the herd's range. We have never seen more than a tiny portion, perhaps 1 to 2% of the herd, utilizing the Canning River. The idea that the Canning River is a vitally important area to wildlife is a recurrent scene in the applicant's exhibits, and appears to be his strongest argument for preferring the coastal route on environmental grounds. It is misleading to imply that the Canning River is either an important range or an important migratory caribou for the Porcupine herd as we now understand it. Therefore, it does not seem to me to constitute a strong argument against the interior route as far as caribou are concerned.

The second point is very interesting also because the applicant implies that the Canning River Valley represents the only area in which there will be year-around activity. The idea that pipeline activities are confined to winter is a recurrent theme throughout the applicant's exhibit, and yet if you look at the bar charts for activity on most construction spreads, you see that in virtually no month of the year does activity completely cease, and some activity may continue through two or more years.

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Even this says nothing about continuing activities, many of them year-around activities which would be involved in the operation and maintenance of the pipeline. I would suggest, therefore, that, "year-around activities" will occur on both the coastal and interior routes, and that the caribou will be disturbed regardless of which route is chosen.

The next three points are quite interesting.

3. "Crosses a major winter range in Alaska."
4. "Crosses a major winter range in the Richardsons."
5. "Is within the northern periphery of the major Central Yukon winter range."

You will note that these are not three individual points, but rather they are all the same thing, that is on the interior route the pipeline passes through parts of the winter range. If the purpose is to make a comparative list, then we could go on to list as advantages of the interior route, that it avoids calving grounds in Alaska; it avoids calving grounds in Canada; it avoids pre-calving movements in Canada, it avoids pre-calving movements in Alaska; it avoids summer movements on the Alaska coastal tundra; avoids summer movements in the Brooks Range, and avoids summer movements on Romansew Mountain and Barn Mountains, thus multiplying the points in favor of the interior route. We should also note that the interior route avoids some winter ranges which the coastal route goes through.

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These are the ranges on the eastern side of the Richardson Mountains, which have been heavily used in recent years and which are very important hunting areas for the people of Aklavik, Fort McPherson and Inuvik.

Q Excuse me, I'm with you
so far. Just before we leave this, you say that we
should also note that the interior route avoids some
winter ranges which the coastal route goes through.
These are the ranges of the east side of the Richardson
Mountains which have been heavily used. Oh yes, yes,
that's the old prime route.

13 A That's right, yes.

14 Q O.K., I'm with you.

15 A That was the prime route
16 that was in effect during the period of my studies and
17 I assume must still be considered a possibility.

18 Q Oh yes.

19 A Point No. 6, under
20 "Disadvantages," says:

21 "Access provided within Canning River Valley
22 and within winter range for hunting."

23 Once again, the Canning River Valley is thrown in our
24 path, and it's also unclear to me under this item who
25 would hunt in the Canning River Valley, even if access
26 was provided. It is important to note also that the
27 coastal route provides access within the winter ranges
28 that I just mentioned, namely, those ranges in the
29 northern and eastern Richardson Mountains.

30 We should also be aware that

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the Dempster Highway has also provided a most adequate access to much of the winter range of the Porcupine caribou herd, and they were previously inaccessible winter ranges, and that this access dwarfs the effect of access created by the pipeline. Perhaps one should argue that a pipeline route ought to follow the Dempster Highway as far as possible so that access is not multiplied, an idea which I broached to the applicant three years ago and to which he never replied.

Point No. 7 under "Disadvantages

"Migratory routes of the Richardson route,"

sorry,

"Migratory movements of the Richardson route have occurred as early as March when winter construction would be under way."

I think that one should consider the possibility that knowing this, one could plan construction spreads to start early in the winter in the Richardson Mountains and to work away from that migratory route so that construction would be far away from the migratory route by the time spring migrations arrive.

We should also keep in mind that the Richardson route is not used by large number of caribou in many years. For example, in the winter of '72-'73 when the majority of caribou wintered in Alaska, these animals got to the calving grounds by a completely different route, all of which were north of the interior route.

1 I have no quarrel with
2 point number eight. To go to point nine we read:

3 "Compressor stations would be located in
4 migratory corridors."

5 While there is not a corresponding item under advantages
6 in that the --

7 THE COMMISSIONER: Excuse me,
8 sorry to interrupt you, Dr. Calef, so that we don't
9 lose this -- The item that you agree with is Mr.
10 Jakimchuk's assertion that one of the disadvantages
11 of the Interior route is that the Old Crow migration
12 is avoided by a variable of 0 to 2 weeks within the
13 proposed construction period, his implication being
14 that/^{is}too tight a timeframe --

15 A Yes, it is, although,
16 the same identical argument applies to this as did
17 to the previous point and that is that the Old Crow
18 migration route is not one that is used in every year.
19 It depends on which winter range is used, and of
20 course, the migration -- the timing of the migration
21 is not precise. It varies from year to year depending
22 on factors which we don't understand. May I go to
23 point nine, now?

24 THE COMMISSIONER: Yes.

25 A Under point nine, we
26 read: "Compressor stations would be located in
27 migratory corridors." While there is not a correspon-
28 ding item under advantages, in that the Interior
29 Route would keep compressor stations out
30 of the calving grounds and out of the path of summer

1 movements of the huge post-calving aggregations, Mr.
2 Jakinchuk has listed compressor stations as a dis-
3 advantage of the coastal route, also, in his previous
4 table. I agree that compressor stations seem to be
5 a disadvantage of both routes in that approximately
6 equal number of compressor stations on each
7 route, in that there are approximately equal numbers
8 of compressor stations on each route, and the caribou
9 would encounter these compressor stations at some
10 time of the year regardless of which route was
11 used. The question is: "in which case would com-
12 pressor stations be more destructive -- if encountered
13 in migration or if encountered on the calving grounds?"
14 The applicant's own data indicate very little
15 response by animals on any of the ranges to the
16 compressor sound simulation. However, according to his
17 own data, there was less response on the migratory
18 routes than on the calving grounds. We also see here
19 how "objective" data are used in one way in one place,
20 and in a different way in another place. First, we are
21 assured that "studies undertaken by Renewable
22 Resources Consulting Services for the applicant have
23 ascertained that noise is an insignificant disturbance
24 to caribou and does not affect their behaviour or
25 movement." That is on page 13 of the direct evidence.
26 But five pages later, that is this item number nine,
27 we are asked to believe that compressor stations located
28 in migratory corridors are a significant disadvantage of
29 the coastal route. What are we to do when data is
30 used in such diametrically opposed ways?

1 Item number ten states --

2 THE COMMISSIONER: I am
3 sorry to interrupt you again, Dr. Calef, let me just
4 make sure that I have got this.

5 I follow you down to the
6 last line of page 17. You threw me off, I think
7 you said "coastal" instead of "Interior" there and,

8 A Okay --

9 THE COMMISSIONER: It
10 is "interior" as printed, it makes sense that way.

11 A Yes, I meant to say
12 "Interior", but it could just as well be applied to
13 the coastal route. The point that I am trying to
14 make is that if it is true that the applicant has
15 such faith in his experimental studies that they
16 ascertained, that is the word that he used, that they
17 ascertained that there is no disturbance, then I
18 don't see why --

19 THE COMMISSIONER: Then it is
20 not an advantage or a disadvantage, either route --

21 A That is right.

22 THE COMMISSIONER: I understand
23 that.

24 A Okay, fine. Finally
25 to point number ten:

26 "Compressor stations and other facilities are
27 often in confined areas, eg. river valleys."

28 Now, I have seen no evidence to indicate that the
29 location of compressor stations in confined areas
30 makes them any more disturbing than if they are located

1 in the open. In fact, one might even suggest that in
2 open areas, they might be heard and seen further away
3 and therefore, might be more disturbing.

4 With these points in mind,
5 may I now submit for your consideration, a table
6 showing the advantages, disadvantages, and neutral
7 characteristics of the interior route as I see them; and
8 I emphasize here that I use the same data as Mr.
9 Jakimchuk.

10 I believe you have that
11 table from the end of my prepared statement.

12 MR. ANTHONY: That is found
13 on the last page, following page 33 of the printed
14 statement of evidence.

15 THE COMMISSIONER: Okay.

16 A The first advantage and
17 what I consider one of the major advantages of the
18 Interior Route is that it avoids the calving grounds.
19 Let me stress some very important facts about the
20 calving grounds, facts with which I believe that most
21 caribou biologists, including the applicant's consultants
22 would agree.

23 First of all, the calving
24 grounds are used every year by the entire reproductive
25 segment of the caribou herd. They have been referred
26 to as the "focal point" of movements and range of
27 the caribou herd, by Dr. Lent, for example, in his
28 presentation and by several other authors in published
29 form. In fact, herds are now classified according
30 to the calving grounds that they use rather than the

1 winter ranges. If we recall Dr. Banfield's original
2 caribou study, we notice that he defined 19
3 separate herds, whereas now all these
4 herds have been reassigned to only four recognized herds.
5 The reason for this discrepancy is that Dr. Banfield's
6 studies took place in the winter and spring when
7 animals from a single herd, which use a single calving
8 ground, were scattered throughout several different
9 winter ranges. This fidelity of a herd, for its calving
10 grounds, means that any activities, any disturbances
11 which occur on the calving grounds, will be certain
12 to be encountered by the caribou, and they will be
13 certain to be encountered by many or all of the caribou
14 every year for as long as they exist.

15 By "they" I mean the
16 disturbances, not the caribou.

17 Secondly, the calving grounds
18 are very restricted in area compared to the area
19 used for winter ranges and migrations. I have computed
20 that the calving grounds used by the Porcupine
21 herd is approximately 4,000 square miles in area,
22 as compared with a minimum of 60,000 square miles
23 which is available and known to be used for wintering
24 an migration. Actually, if you include the
25 coastal areas and the Old Crow Flats where
26 migration often occurs as Dr. Lent pointed out,
27 then the area available for wintering and migrations
28 becomes more like 90,000 to 100,000 square miles.
29 That is to say, the calving grounds are at least
30 fifteen times as restricted as the other ranges. One

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1 might make an analogy between the caribou population
2 and a population of salmon. The immature fish
3 have huge areas of ocean to feed in, but they migrate
4 and return to restricted areas of a river to
5 spawn. Entire salmon runs ^{can be} wiped out by destroying
6 a very small area of stream. Might this not also
7 hold true of the restricted ranges of the caribou?
8 Several different studies have provided indications
9 that caribou are more sensitive to disturbance on
10 the calving grounds than they are at other times of
11 the year. Dr. Bergerud, in his studies of the Newfound-
12 land caribou, found them to flee from humans on the
13 calving grounds at a greater distance than they
14 did at other times of the year. Dr. Lent observed the
15 same increased sensitivity of calving caribou
16 at the other end of the continent, in the Arctic
17 herd of Alaska and has also noted in his presentation
18 here that the greatest avoidance of the Trans-Alaska
19 Pipeline system has occurred during calving and
20 post-calving aggregations. Elmer DeBock of the Cana-
21 dian Wildlife Service in analyzing the reaction of
22 caribou to aircraft disturbance, found the calving
23 period to be the period of maximum sensitivity to air-
24 craft disturbance.

25 Now, to go to the dis-
26 advantage column for the interior route, number one says
27 that the interior route crosses both spring and fall
28 migration routes. We should note, however, that
29 depending on which winter ranges the herd uses in
30 a given year, only a fraction, possibly only a
small fraction of the caribou would encounter the pipeline

1 on spring migrations. As we said earlier, anything
 2 on the calving grounds would be certain to be
 3 encountered by a high percentage of the caribou
 4 population.

5 The second advantage of the
 6 interior route is that it avoids encountering the
 7 huge post-calving aggregation in which the entire
 8 caribou population assembles into one group. This
 9 aggregation takes place in an even more
 10 restricted and an even more consistent area from year
 11 to year than does the calving. We don't understand
 12 the forces which account for this aggregation or
 13 its adaptive value to the caribou. However, we know that
 14 this quite short period of perhaps two weeks is necessary
 15 for the establishment of the very large herds which
 16 then travel together during the next four weeks of the
 17 summer. The interior route also avoids these summer
 18 movements and autumn movements of the herd as well.
 19 That is item number three under my advantages of the
 20 interior route.

21 I consider the summer
 22 movements of the very large herds of caribou, that is,
 23 the movements during the month of July, to be perhaps
 24 the most sensitive phase in the life history of
 25 the caribou herd, the period at which harassment
 26 or unusual disturbance could have the most harmful
 27 effects. Let me explain this.

28 These herds are under great
 29 stress at the time. Mosquitoes, warble flies and
 30 botflies attack them relentlessly. The energy demands

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1 for antler growth, moulting and nursing are at
2 the maximum for the year. We have evidence to show that
3 the majority of the mortality which the calf crop
4 suffers occurs during this short period. Calves are
5 dying from exhaustion, accidents, predation and
6 possibly from losing blood to insects. Harassment
7 at this time can cause stampedes which would result
8 in calves being separated from their mothers, thereby
9 increasing their susceptibility to all sources of
10 mortality.

11 I might just note here
12 that I have seen two stampedes of very large herds of
13 tens of thousands of animals which have been
14 caused by predators, and also by insects so that
15 these stampedes are occurring naturally and could be
16 added to by any sort of human disturbances.

17 Any disturbances that in-
18 crease the level of stress would also reduce the
19 animals' reserve and put them closer to succumbing.
20 This is a very important point and I think maybe
21 I would like to show a few slides here just to give
22 you some idea of what the post-calving aggregations
23 look like and some of these factors that I have
24 just mentioned.

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1 A This first slide shows
2 the beginning of the evening movement of a herd of about
3 35,000 caribou on the North Slope of the Brooks Range
4 just west of the Malcolm River. This is just to give
5 you some idea of the magnitude of these herds and the
6 ruggedness of the terrain that they're moving through at
7 the time.

8 Next slide, please. Just
9 another example to show you the ruggedness of the
10 terrain and also that virtually all the animals are
11 involved. You'll see bulls, calves, yearlings, cows,
12 all the segments of the caribou population are represen-
13 ted in these herds.

14 Next slide.

15 Q The calving, we were
16 told by Dr. Banfield, takes place -- and by Mr. Jakim-
17 chuk -- takes place in the foothills early in June,
18 and then the post-calving aggregation consists of a
19 westward movement along the coast and into Alaska,
20 that is out of the foothills and along the coastal
21 plain into Alaska, and then that would occur, I would
22 assume, in July, and this movement that you're showing
23 now would be the -- after this aggregation has occurred
24 they begin moving back into the foothills and into the
25 mountains. I'm putting this all kind of roughly, but
26 am I --

27 A You've made a couple of
28 statemen_ts there which I would disagree with. Let
29 me tell you the way I see it. I'm sorry now that I
30 didn't include a couple of other slides that I intended

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1 to which could have made this a lot clearer.

2 The calving takes place on
3 both the coastal plain and the foothills, and according
4 to my data, the data of Grant Lorty and myself, approxi-
5 mately equal numbers of caribou calve in the foothills
6 and on the coastal plain. In at least the first three
7 years of the studies of this herd, that's the springs
8 of '71, '72 and '73, the majority of the calving seemed
9 to take place in the Yukon and in the very, very
10 easternmost part of Alaska.

11 Now the animals are quite
12 scattered during calving, and immediately after calving
13 they continue to move west into Alaska and they also
14 tend to aggregate more and more and more until finally
15 virtually the entire herd is present in one area which
16 in the years of my study, and I understand has been
17 quite consistent until this past summer, these aggre-
18 gations formed around the Jago River in Alaska on the
19 coastal plain, and in fact just at the edge of the
20 foothills. Then this herd begins to move eastward
21 along the coastal plain, and I believe it generally
22 moves about 75 to 100 miles eastward along the coastal
23 plain, and then it tends to move into the foothills
24 and into the high mountains.

25 So to put it into chronology,
26 we have scattered calving on the foothills and
27 coastal plain starting the 1st of June. You have calving
28 during the first two weeks of June, then a western move-
29 ment and a gradual aggregation until the peak numbers
30 are reached right about the end of June in Alaska

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on the coastal plain, and then these herds move eastwards into the mountains and through the mountains for the entire month of July.

Q And you wouldn't quarrel with the migratory movements from the late summer onward that Mr. Jakimchuk charted for us in the Biological Report series, there were a series of maps in Volume, whatever it was. You weren't here, I guess; maybe you were.

A No, I was not. I'm sure that I would have no quarrel with the map showing distribution, ^{abundance} and movements of the caribou that have been collected by Mr. Jakimchuk's company. If either he or Dr. Banfield made the assertion that there's limited calving on the coastal plain, I would disagree with that.

Q Dr. Banfield did. I don't remember whether Mr. Jakimchuk did. He said it takes place for the most part in the vicinity of the foothills and in the foothills. He said, as you have, that it was not a herd or anything, it was sort of a vast continuum right along the foothills. Well, anyway, carry on. I just wanted to clear that up.

A Yes. O.K., can we go to the next slide? As Dr. Lent has commented, these animals seek relief from insects on high windswept slopes. We found a pattern of dyernal activity in which the caribou were quite inactive during the mid-day. They usually just lay around and fed kind of intermittently on these high windswept slopes during the high

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1 temperatures of the daytime, and then they moved into
2 the valleys during the evening. This gives you another
3 idea of the density of these herds.

4 Can we go to the next one?

5 Here is another example. There is perhaps 10 to 15,000
6 animals in this group, again on a very windswept slope.

7 Next slide. I spoke about the
8 insect harassment. I'm sorry I don't have pictures of
9 the caribou themselves experiencing it, but this is one
10 advantage of studying a mammal that is quite closely
11 related to human beings. You experience the same things
12 that the animal does.

13 Could we have the next slide?

14 There's another example of very severe insect harassment.
15 These people are just about to stampede.

16 Could we go to the next one?

17 This is just to show you the changes in the peltage,
18 that is the hair covering of the animal and the antlers.
19 This is a picture of a bull taken, I believe, in mid-
20 June, and you can see that the antlers are growing quite
21 rapidly, but they're still small at the time and I don't
22 know whether you can make it out from this slide, it's
23 a little dark, but you can see that the coats are
24 still -- the winter coats are still essentially intact.
25 However, if we go to the next slide, which was taken
26 about a month later, look at the amount of antler growth
27 which has taken place in a month, and please also
28 observe the black splotches on the caribou, particularly
29 around the necks which indicates that the old hair has
30 fallen out and that the new hair is growing in.

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1 Next slide. You can see, here's
2 a closeup showing that patch of shed hair and new growth
3 on the neck of that first bull.

4 Next picture.

5 Q What time of year would
6 that be again?

7 A That photograph was taken
8 on the 11th of July.

9 Q Mr. Jakimchuk said that
10 by the end of August the animals are fat and sleek, that
11 is the period of summer was the -- when they fed, pre-
12 sumably in a way that provided them with a greater store
13 of energy and so forth than at any other time of the
14 year. There's no argument about that, I take it?

15 A I would argue with the
16 use of the word "summer". I would actually call it
17 early autumn, but rather than using these seasonal
18 terms, let's do it in terms of months. I don't think
19 that very much weight at all is put on until the begin-
20 ning of August when the insect harassment has declined.
21 I would say that the weight is put on from approximately
22 the 10th of August through the rut, which begins in
23 early October, say the 12th of October.

24 This is just to give you some
25 idea of the density of these herds and the milling
26 of them. Just show these next two or three quite
27 rapidly. These are the situations where you get stampedes.
28 This is the situation of very great stress to the animals.

29 Next slide, and to the next
30 one, please, and this is where calves become separated

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1 from their mothers, and if you follow one of these
2 herds on the ground you're continually encountering
3 both calves and females who are lagging behind the
4 other group, and are searching for each other. If a
5 cow loses its calf it will often go back, and the
6 calves will come right up to you quite close to see
7 whether you are their mother or not, and the cows will
8 come not so close, of course, because they have more
9 experience. But presumably any animal, any calf that
10 is lost and is not reclaimed by its mother has virtually
11 no chance at all of survival. This is just an example
12 of a calf which has been killed by a wolf. You can see
13 the typical evidence of wolf attack, the bites on
14 the head and neck of the calf.

15 Now I said that virtually --
16 well, I don't remember the exact words, but much of the
17 mortality that the calves suffer in the summer occurs
18 in this very, very short period during July, and you
19 can see the tremendous drop, almost vertical drop.
20 This is my data from 1972 and there is, I think you
21 have another figure. I think Mr. Anthony gave you
22 another figure which shows virtually identical mortality
23 curve which was produced by Renewable Resources Consult-
24 ing Company for the summer of 1973. But the fact re-
25 mains that we agree that a great deal, perhaps 40%
26 of the calves die during a four-week period in July.

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1 Now, I can return to the
2 written testimony.

3 MR. ANTHONY: Before
4 Dr. Calef recommences and while the lights are going
5 on, I could perhaps assist the other counsel by
6 indicating that that table was filed in the Biological
7 Report Series, Volume 22 on page 67. This was the
8 other figure that Dr. Calef indicated supported the
9 sorts of conclusions that this slide indicated.

10 A Thank you. Another
11 advantage of the Interior Route is that migrating
12 animals would be in the vicinity of the pipeline for as
13 little as two weeks, whereas on the Coastal Route,
14 migrating animals would be in the vicinity of the
15 pipeline for as much as two months.

16 In the disadvantage column
17 again, we note that the Interior Route crosses the
18 winter ranges which are used in some years. However, as
19 we said earlier, the Interior Route avoids some winter
20 ranges which have been used by a great many caribou in
21 recent years. I am thinking of the northern
22 Richardson Mountains and their eastern foothills north
23 and west of Aklavik, and all the way down to Fort
24 McPherson. Please remember also that some of the winter
25 ranges are not near either of the pipeline routes.
26 These are the winter ranges south of the Porcupine
27 River which constitute more than half of the available
28 area for wintering and where the caribou winter during
29 the first two years of the applicant's studies. Even
30 though the caribou were wintering in a range that was

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1 close to a pipeline route, all of the animals would not
2 necessarily be in contact with a pipeline because the
3 winter distribution is usually much more widespread
4 and involves a lower density of animals than on the
5 summer range.

6 The next -- so we have
7 a disadvantage of the Interior Route in that it crosses
8 some winter ranges -- that is point number two under
9 disadvantages but we should also consider it an
10 advantage of the Interior Route that it avoids some
11 winter ranges.

12 The next advantage we
13 note, is that on the Interior Route most of the animals
14 have passed the pipeline right-of-way by the peak floods
15 of spring and by the beginning of the melting of the
16 active layer. This, of course, is the period when
17 pipeline surveillance would have to be most intensive
18 because of the possibility of floods and erosion
19 damaging the pipe. And I don't just mean at river
20 crossings here, I mean on side slopes and any place
21 where there is water and thermal melting occurring.
22 However, the period of maximum river activity and the
23 maximum melting of the active layer occurs on the
24 Coastal Route during the period of calving and post-
25 calving movements. Therefore, we would expect more
26 surveillance flights on the Coastal Route and a greater
27 possibility of contact between caribou and emergency
28 repair operations on the Coastal Route. That is, points
29 number 6 and 7 under advantages.

30 Finally, the next two

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1 items have to do with less tangible but very real aspects
2 of the two routes. We note that the Coastal Route would
3 cross the Arctic Wildlife Range in Alaska and the pro-
4 posed Canadian Arctic Wildlife Range both of which
5 the Interior Route avoids. Now, that statement which I
6 wrote there is not entirely true; the Interior Route as
7 it exists right now would be on the very southern edge
8 of the proposed Canadian Arctic Wildlife Range which
9 is the Porcupine River. However, if the Interior Route
10 were to go south of that river, it could entirely avoid
11 both ranges.

12 The Arctic Wildlife Range
13 in Alaska as it presently exists would appear to qualify
14 for protection under the American "Wilderness Act".
15 Inclusion of the area as wilderness under the Act would
16 give strong protection to the calving grounds and the
17 summer caribou habitat in that area. This is because an
18 area which has been declared a Wilderness in the United
19 States is exempt from any human, technological or
20 industrial activity. If the pipeline were to go
21 through that wildlife range, prior to its official
22 designation as wilderness, it would no longer be
23 considered wilderness. It would not qualify under the
24 Wilderness Act, and it would then be open to a variety
25 of threats: including oil pipelines, permanent
26 roads, test drilling, and perhaps eventually to produc-
27 tion of petroleum. Thus, even if we assumed that a
28 natural gas pipeline would have very little effect on the
29 summer range or the calving grounds of caribou, we
30 could not assume that all these other activities would

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1 also be harmful and yet the single --

2 THE COMMISSIONER: Would also
3 be harmless. I only interrupt because I don't think
4 you are correcting this as you go along. We --

5 That is supposed to be "harm-
6 less", isn't it?

7 A Yes, it is, sorry.

8 THE COMMISSIONER: Sorry.

9 A And yet the single
10 violation of the gas pipeline would take the area out
11 of wilderness status. I feel that this is a point of
12 utmost importance to the future of the Porcupine caribou
13 herd.

14 Mr. Commissioner, the ap-
15 plicant's environmentalists have repeatedly expressed
16 concern over the combined effects of several developments.
17 By choosing the Interior Route they could insure that the
18 wilderness character of the calving grounds and the
19 summer range of the porcupine herd would remain intact
20 and therefore that these ranges would continue to
21 receive legal and social protection. By recommending
22 the violation of the wilderness by the gas pipeline
23 they are consciously opening the door to the multitude
24 of developments which they themselves say they fear could
25 harm the caribou.

26 Finally, from the point
27 of view of human beings observing caribou, we should
28 note that summer time when it is possible to travel,
29 when there is light for photography and observation, and
30 when the caribou are in very large herds moving through
mountainous terrain where they can be observed from

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1 a distant height of land is the time when they are on the
2 coast and the mountains near the coast. And I believe
3 that I speak for most lovers of wilderness and
4 observers of animals when I say it would detract from
5 the pleasure and the experience of observing a huge
6 herd of caribou if there were a compressor station in
7 the backdrop. Now, I realize of course that this is a
8 double-edged sword and I am not suggesting that large
9 numbers of people should visit the caribou range and
10 observe and photograph these animals. That would
11 constitute a very important form of harrassment in
12 itself. However I do make the point that the openness
13 of the habitat and the fact that the caribou are in
14 large herds at the only really pleasant time of the
15 year is another point in favour of avoiding the calving
16 grounds.

17 Now, we should go to what
18 I consider the neutral characteristics of both routes.
19 The first is the existence of compressor stations. I
20 discussed this earlier in my criticism of the appli-
21 cant's analysis of advantages and disadvantages of
22 compressor stations. However, we might just note one
23 more thing here and that is, if compressor stations are
24 constructed in the summer, then clearly this would be
25 more harmful on the Coastal Route where the caribou
26 are present throughout the summer, than it would be on
27 the Interior Route where they are absent. Finally, if
28 we look at the routes in terms of which native hunting
29 areas they cross, we find that each route impinges on
30 the hunting areas of approximately 4 native villages, so

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1 there seems to be nothing to choose in this respect.

2 I have listed on this
3 table the villages, the hunting areas of the villages
4 which would be affected by the two routes, the Interior
5 Route passes through hunting areas used by Arctic Village,
6 Old Crow, Fort McPherson and Inuvik. The Coastal
7 Route passes through the hunting areas used by Kaktovik,
8 Aklavik, Inuvik and Fort McPherson.

9 Mr. Jakimchuk concluded
10 his testimony, concerning his preference for the coastal
11 Route by stating,

12 "In summary, my preference is based on
13 considerations in detail of the ecology of
14 the Porcupine caribou herd and factors which
15 may influence their productivity and population
16 status."

17 So is my preference for the Interior route. It
18 indicates, I hope, that it is possible to take the
19 same information on population, movements, and behav-
20 iour; information upon which all parties can agree and
21 yet draw quite different conclusions as to the risks
22 involved.

23 Throughout these
24 hearings, the environmentalists for the applicant have
25 continually stressed the importance of relying on
26 "actual data", rather than theory. Yet, I find that
27 much of the analysis of impact potential that has been
28 submitted to this hearing by the applicant consists of
29 unsupported theory about why caribou do what they do
30 and in some cases contains unsupported assertions about

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1 caribou behaviour that apparently are inconsistent within
2 their own documents and certainly is inconsistent with
3 my understanding.

4 I would just like to give
5 you a few examples. On page 6 and 7, they speak about
6 the "purposes" of long annual migrations. First, just
7 one small point. One generally does not speak of
8 purposive behaviour but rather of behaviour which has
9 been selected over long periods of time to be most
10 adaptive to a species. In other words, the caribou
11 don't get together and say, "Well, I think we ought to
12 go to the coast this year because we will get away from
13 insects or whatever."

14 However, we shall look at
15 the points noted. They say migration "enables caribou
16 to utilize range most effectively without over-
17 utilization". I would be very surprised, sir, if the
18 applicant's consultants could, with the data available
19 to them do an analysis of migration and prove that the
20 patterns used are the most effective utilization of range.
21 We know remarkably little about the productivity of
22 caribou ranges, their carrying capacities, the
23 nutrient contents of plants in various areas and so
24 forth.

1 Again, they speak of "the most favourable energy
2 balance." I have seen no proof whatsoever to indicate
3 that energy is a major factor involved in migration.
4 Caribou migrations may have evolved because they
5 allow the animals to calve in areas of lower predator
6 population and less insect harassment. We suspect
7 that the calving grounds of the Porcupine caribou
8 herd have a much lower density of predators,
9 particularly wolves, than do the areas further to the
10 south. The migration enables the caribou to leave
11 behind the bulk of the wolf population which dens
12 during April and May. We also note that the
13 emergence of blood sucking insects is as much as
14 six weeks earlier in the areas used by caribou
15 in winter than it is on the calving grounds, and we
16 saw earlier that these insects are one of the major
17 factors contributing to the stress and mortality
18 of calves in the summer. If the caribou did not
19 migrate they would be exposed to this stress for
20 longer periods of time and also at a time when the
21 calves were much smaller. The calves double
22 in weight during the first two weeks and I suspect
23 that the attack of mosquitoes on a 13-pound animal, that
24 is birth weight, is more devastating than the attacks
25 on a 25 to 30-pound animal.

26 If we go on to page nine,
27 the description of the winter range contains two
28 assertions for which I can find no substantiating
29 data. The first is the idea that caribou in the
30 winter make "random" movements within the winter

1 range, an idea that is contradicted almost within the
2 same sentence in which the author speaks of
3 them "seeking out lichens and soft shallow snow." I
4 think that we do not have enough information on
5 the winter ranges and winter behaviour of caribou
6 to say whether their movements are random or not.
7 Later in that paragraph we note the assertion that
8 caribou winter on the North Slope and the Old
9 Crow Flats during "winters of minimal snowfall." I have
10 not seen any information on the depth or any other
11 characteristics of snow during the periods that the
12 caribou winter on the North Slope or the Old Crow
13 Flats.

14 I would like to add some
15 evidence just on this point that was not available
16 to me when I wrote this testimony. I took the trouble
17 last week to send a telex to Coppermine to get some
18 information on the snowfall in Coppermine last winter
19 where a rather large herd of caribou wintered on the
20 tundra right near and around the village of Coppermine.
21 This was the first time that a very large herd of
22 caribou had wintered in there in at least a decade,
23 according to my understanding. There were approximately
24 15,000 to 20,000 animals involved and they were
25 part of the Bathurst herd. The data which I
26 received indicates that from October to January of
27 last year, inclusive, 35.2 inches of snow fell in
28 Coppermine. The ten year average for snowfall in
29 Coppermine from the years 1958 to 1968 is 25.9 inches,
30 that is to say, last year during the winter, 36% more

I hope that these are enough examples to make the point. The point being that

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1 "data" themselves do not provide the answers for
2 predicting impact on caribou or any other animal
3 populations. Data must be interpreted and the
4 interpretation must be extrapolated, and the
5 applicant apparently engages in these activities
6 with as much enthusiasm but with as little success as
7 any of the rest of us.

8 Finally, I would like to
9 go to the applicant's field experiments which he
10 considers to be the distincting strength of
11 his research program. These field experiments are
12 considered "of paramount importance since these
13 studies provided a scientific basis on which to
14 assess concerns and refine the speculative hypothesis
15 into a probability analysis." The field experiments
16 purport to be the "singular attribute of the applicant's
17 studies", and that only he "of all the agencies involved
18 in assessing this project has conducted experimental
19 studies."

20 The first thing that I would
21 like to do is point out that this is not true that
22 only the applicant has conducted experimental studies,
23 unless one employs a very narrow definition of
24 experimental study. Mr. Elmer DeBock of the Canadian
25 Wildlife Service has made excellent, detailed observat-
26 ions of the behaviour of the caribou in response to
27 traffic and hunting on the Dempster Highway. Mr.
28 DeBock did not plan and construct the Dempster Highway,
29 but he took advantage of its existence to gain inform-
30 ation about the behaviour of caribou. The highway was

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1 built, the caribou were responding to it and Mr.
2 DeBock was observing their behaviour. This is what
3 field biologists call a "natural experiment", at least
4 it would be a natural experiment if it were a land
5 slide or a particularly heavy snowfall, or something
6 like this. Similarly, all parties studying caribou
7 have experimented with the effect of aircraft distur-
8 bances and have published the results of their
9 findings. Lest the applicant argue later on that such
10 "natural experiments" are not the type of "field
11 experiments" that he had in mind, we note that he
12 talks about "testing possible impact factors"
13 including "deflection of caribou from a cleared right-
14 of-way". These studies were done by using already
15 existing seismic lines, winter roads, airstrips,
16 drill sites, and simply observing the behaviour of
17 the caribou. The applicant's consultants were taking
18 advantage of the same type of natural experiments and
19 making the same type of observations that Mr. DeBock
20 was.

21 Let us turn now to the
22 experiments that are unique to the applicant's
23 program in Canada at any rate. That is, the experiments
24 in which he constructed simulation devices and
25 observed the subsequent behaviour of caribou. If one
26 takes the attitude that only by actively simulating
27 an impact can he obtain good, hard data on impact,
28 then he has a great responsibility to ensure that
29 his experiment accurately simulates all stimuli of
30 the disturbance that they are meant to mimic, and that

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1 the experiments are performed under all conditions that
2 the caribou are likely to encounter. Consider for
3 example, the compressor station noise simulation.

4 It simulated one aspect of
5 a compressor station, the noise. Consider an
6 actual compressor station. It consists of a large
7 gravel pad supporting several buildings, including some
8 very large ones. The station emits, in addition to the
9 sounds, visual stimuli, olfactory stimuli, and perhaps
10 even tactile stimuli in the form of vibrations of the
11 ground. It has a crew of men. Aircraft and
12 vehicles come and go. Now, I ask, Mr. Commissioner,
13 is a small loud speaker system producing compressor
14 station noise in any way a simulation of the total
15 impact of a compressor station on caribou? Does it
16 provide the hard data that we need? I would also
17 like to consider the oil pipeline simulations
18 which were done in Prudhoe Bay in Alaska as another
19 type of simulation. There are the ones that Dr. Lent
20 showed. Again, I would ask, is a simulation consisting
21 of a snow fence covered with burlap sacking : which
22 creaks and flaps in the wind a suitable simulation for
23 a 48" steel pipeline mounted on pilings?

24 Moreover, is this simulation,
25 which was about two miles long and which the
26 caribou were perfectly capable of walking around, and
27 that was, as we saw, the most common response, similar
28 to an uninterrupted 50-mile stretch of pipeline which
29 by no stretch of the imagination could the caribou
30 walk around. Is the response of a group of a few

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1 hundred caribou making local movements apparently
2 dictated by insect harassment in any way comparable
3 to the response of tens of thousands of pregnant
4 female caribou rushing through the snow to reach
5 the calving grounds? I suggest that the answer
6 to all of these questions is no.

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1 In addition, in both of
2 these cases we are considering the behaviour of the
3 caribou in isolation from other disturbances and
4 without knowledge of their previous experiences. For
5 example, there have been several reports of quite
6 different behaviour of caribou towards human beings and
7 snowmobiles, depending on whether or not the animals
8 had been recently hunted. For example, in the spring
9 of 1971, my partner and I found that we could approach
10 to within 30 to 50 yards of caribou in plain sight.
11 Even then the animals usually did not run away. They
12 usually just walked or trotted off a little distance
13 and tried to maintain a distance of 50 to 100 yards
14 between them and ourselves.

15 These animals had been winter-
16 ing in the Ogilvie Mountains where presumably they
17 experienced little hunting pressure throughout the winter.
18 In the spring of 1973 after the caribou had wintered
19 in the east fork of the Chandalar River near Arctic
20 Village, and had been heavily hunted from snowmobiles
21 all winter, I found that I could hardly approach to
22 within 300 yards of the caribou, and when they sighted
23 a man they would run and they would run out of sight.

24 Once again, I would argue that
25 unless the applicant's simulations take such things
26 into account, they go only a small way in improving
27 our prediction about impact.

28 I might just note here that
29 the applicant's simulation experiments of compressor
30 station noise with which I am familiar, took place in

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1 the spring of 1972, which would be in the spring in
2 which the major wintering was in the Ogilvie Mountains,
3 and therefore they had experienced little disturbance
4 all winter prior to encountering the simulation.

5 Mr. Commissioner, for several
6 weeks you have been listening to people tell you what
7 we know about caribou. I thought it might be worthwhile
8 to summarize those things that we do not know about
9 caribou. We know the winter ranges that are used by
10 this herd, but we do not know why some ranges are chosen
11 in one year and then others used the next. We know very
12 little about the winter behaviour, about the winter
13 diet, and about how the winter conditions influence the
14 productivity of the herd in the following spring.

15 We have mapped what seemed to
16 be the major spring migration routes. We have no idea
17 of how these are learned. We have no idea of what their
18 advantages are over other potential routes, and we don't
19 even know what the stimuli are which initiate spring
20 migration. We know where the calving grounds are; we
21 do not know what their advantages are, why they are so
22 consistently used by caribou, and we do not know what
23 the productivity and survivorship of that herd would be
24 if it were forced to calf in another area.

25 We know that the movements of
26 the very large summer herds are quite consistent from
27 year to year. We don't know why. Finally, we know that
28 the population of this herd has been approximately
29 stable over the past 10 to 15 years, but we do not
30 know how births and deaths are balanced. We do not know

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1 how much of an increase in the death rate or how
2 much of a decrease in the birth rate would be required
3 to precipitate a decline in the herd.

4 Mr. Commissioner, Gas Arctic's
5 submission of potential impact of the pipeline on the
6 Porcupine caribou herd concludes with the statement by
7 Mr. Jakimchuk:

8 "It is in fact my expectation that actual losses
9 or effects attributable to the pipeline, both
10 short and long-term, will be negligible."

11 This is meant to be a reassuring statement, a statement
12 of optimism. I would like to turn it around to become
13 a dire warning. I think it is absolutely true that
14 actual losses or effects attributable to the pipeline
15 will be negligible, not necessarily because they don't
16 occur, but because they will not be directly attributed
17 to the pipeline. We will not be able to attribute them
18 with certainty to the pipeline.

19 Mr. Banfield admitted this
20 during his cross-examination by Mr. Bayly. No exhibit
21 with which I am familiar has outlined a program for
22 following the population dynamics of the herd during
23 and after the project to ensure that any changes or
24 trends would be detected. This is something I think
25 is very important. I think we have a magnificent oppor-
26 tunity here because of the high quality of population
27 data and movement data which has been accumulated prior
28 to the project. I think this is something that the
29 applicant should be proud of, and that he could follow
30 up on. In fact, Mr. Jakimchuk has testified that such

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1 business is the responsibility of the Game Departments.
2 He has admitted that the combined effects of the pipeline
3 project, along with those of highways and other develop-
4 ments may all add together to produce an effect which
5 is sufficient to start a decline of the caribou
6 population, but he says we must put limits on our
7 predictions of impact.

8 In my final report for the
9 Environment Protection Board I made the statement that
10 the Porcupine caribou herd could decline by as much as
11 90% in five to ten years. Such was the fate of the
12 40-mile herd, and such was the fate of the Nelchina
13 herd in Alaska. Whether the declines of these herds
14 can be attributed to the developments and activities
15 of man is not entirely clear to me. But that 90%
16 decline of great caribou herds did occur is unequivocal.
17 I do not think that we are in a position to say that
18 the proposed CAGSL pipeline will not produce or con-
19 tribute to similar declines in the Porcupine herd, and
20 when we're dealing with 115,000 animals, with one of
21 the last wildlife spectacles on the face of the earth,
22 with a very important part of the culture, the history
23 and the current well-being of the native peoples who
24 have inhabited this continent for at least 25,000 years,
25 with the representatives of a group of animals whose
26 lives have been a part of the world of human beings
27 for tens of thousands of years, both here and in
28 Eurasia, I feel that we have an awesome responsibility
29 to proceed slowly and cautiously with projects which
30 may ultimately destroy them.

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Cross-Exam by Bayly

1 THE COMMISSIONER: Well, thank
2 you, Dr. Calef.

3 We'll adjourn till two o'clock
4 and cross-examination can proceed then, and we'll carry
5 on this afternoon for perhaps a couple of hours, if
6 we can all make it.

7 (PROCEEDINGS ADJOURNED TO 2 P.M.)

8 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

9 THE COMMISSIONER: We'll come
10 to order, and Mr. Bayly, if you're ready to begin we'll
11 just start.

12
13 CROSS-EXAMINATION BY MR. BAYLY:

14 Q Dr. Lent, we've heard in
15 your evidence and in the evidence of others before this
16 Inquiry that there is a small herd of muskox which may
17 be affected by the route of the Arctic Gas proposal
18 on the North Slope. Are you acquainted with the area
19 used by that herd of muskoxen, and can you give us
20 any idea of effects that may be caused?

21 WITNESS LENT: Yes, I'm
22 generally acquainted with the area, and I was involved
23 in the transplant operations resulting in those muskoxen
24 being there. These were in 1969, and a second trans-
25 plant in 1970. I certainly want to commend Renewable
26 Resources and others involved for the applicants on the
27 excellent job which they've done in documenting the
28 move_ments and distribution of these muskoxen, collect-
29 ing data on calf production in these groups.

30 This is a job which unfortunately

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Cross-Exam by Bayly

1 has not been done adequately by game management agencies
2 in Alaska. If I could go back a little bit, quite a
3 ways back, I guess.

4 In the 19th century, so far
5 as we know from limited information, muskoxen were pre-
6 sent along the Arctic coast probably from west of the
7 Mackenzie to about the area of Cape Thompson, that is
8 as you sort of go around the corner, as it were, in
9 Alaska, heading down the west coast, essentially a
10 coastal fringe distribution with occasionally perhaps
11 movements somewhat farther inland. We feel that
12 probably there were never great numbers of muskoxen
13 in this area, and at any rate so far as we know the
14 last ones were exterminated in the last part of the --
15 second half of the 19th century, probably as a result
16 of introduction of firearms and demand for meat in
17 that area.

18 So we have in the case of
19 the Arctic Wildlife Range animals, re-introduction into
20 natural muskox range, the first one in Alaska. The
21 animals having been brought from Nunivak Island, as I
22 said in 1969 and 1970, and these animals themselves or
23 their descendants, that is, came from East Greenland
24 in the 1930's. Of course the transplant to the Arctic
25 Wildlife Range was carried out with considerable
26 expense to American taxpayers, and I might add that we
27 have apparently also provided the Yukon Territory with
28 some muskoxen, and some more recent information I've
29 seen indicates that there are at least two small groups
30 in the Northern Yukon Territory that seem to have

Calef & Lent
Cross-Exam by Bayly

1
2 stabilized -- that is stayed put for some time now --
3 one group just south of Herschel Island and another
4 group somewhat farther inland in the Blow River drainage.
5 I believe these number five or six animals each. There
6 are details available in Renewable Resources reports.

7 At any rate, yes, there are
8 three fairly well defined areas in the northern portion
9 of the Arctic Wildlife Range in which all these three
10 areas of course are crossed by the coastal prime route.

11 Now, the initial two transplants
12 numbered approximately 75 animals. There was quite a
13 bit of initial mortality but since then there's also
14 been reasonably encouraging calf crops, and again we
15 are indebted to Renewable Resources for most of this
16 information. So things are encouraging, but we're
17 still talking about only about 50 animals at the most,
18 I'd say, and their future is^{still}/somewhat uncertain.

19 Now, perhaps I could just
20 add a few remarks about muskox behaviour that may be
21 relevant. I have been involved for several years in
22 work on Nunivak Island, that's off the south-west coast
23 of Alaska, where there is a herd of approximately 650
24 muskoxen. These remarks are also relevant, I think,
25 to the report of Dr. Geist on harassment effects which
26 he indicates in that that there's very little information
27 available on that subject. Well, in the work done
28 on Nunivak Island it's been quite clear to me that
29 muskoxen are particularly sensitive to disturbance, and
30

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Cross-Exam by Bayly

1 they are most sensitive, or at least the latest potential
2 for problems occurs during and immediately after the
3 calving period. Muskoxen calve earlier than caribou,
4 the first calves on Nunivak Island start showing up in
5 significant numbers in about mid-April, and the peak
6 of calving is in May. The calving period is then a little
7 more spread out over time than in the case of caribou.

Responses of muskoxen to predators are somewhat different than in the case of caribou and I am sure that you are probably generally aware of this. Caribou, obviously flee as a response to predators, natural predators. Muskoxen are more inclined to stand their ground, that is, to take a defensive formation, particularly in response to wolves, and that is for natural predators, this is quite a successful tactic. However, we found on Nunivak that they do not always take this defensive formation in response to human disturbance, particularly when such disturbance involves loud noise, such as that associated with snow machines, airplanes, helicopters, etc. In such cases they very frequently, not always, but very frequently will run considerable distances, up to a couple of miles following such disturbance. This, of course, is energy expenditure and all that, but the more important point is that young calves can be separated from the group during that type of disturbance, and since this is not a normal, natural behaviour, the mothers are much less likely to recover those calves than in the case of, say, caribou. In other words, the natural behaviour is to take a defensive formation at or near where they encounter whatever the threatening source of disturbance is, but they don't always do this, in fact usually don't in response to aircraft or other loud machinery.

Okay, so therefore we have documented on Nunivak Island cases of such disturbance,

1 particularly with snow machines resulting in dissection
2 and death of calves, and in fact, in one case, a
3 somewhat different situation where a group took a
4 defensive formation on the edge of a cliff. A newborn
5 calf of about two days of age fell off the cliff and
6 I was personally responsible for this event during the
7 course of my studies. So this is a species which
8 particularly during that period of year, April, May,
9 perhaps in early June, is very prone to mortality
10 due to disturbance or harassment. Aircraft noise
11 very frequently in fact at other times of year as
12 well, will excite them. It causes, for example,
13 stimulates bulls to fight with one another and
14 results in groups moving rapidly in response to
15 aircraft noise. So this is a potential problem
16 which perhaps has not been brought out sufficiently
17 in testimony regarding these muskoxen.

18 Q Now, you have pointed
19 out that this herd is in the Arctic Wildlife Range
20 and I believe in answer to the Commissioner's question
21 this morning you referred to having read some of the
22 evidence given by other witnesses regarding this
23 range. I think you have before you volume 99 of
24 the transcript --

25 A Yes.

26 Q -- and it is in that
27 volume, starting at page 15067 that Mr. Scott is
28 cross-examining the panel, and in particular Mr.
29 Hemstock, with regard to whether the area within
30 the Arctic Wildlife Range is a unique area --

Calef, Lent
Cross-Exam by Bayly

1 THE COMMISSIONER: Is a
2 what?

3 MR. BAYLY: Is a unique
4 area of coastal tundra and having read that, would
5 you care to comment on the opinion of Mr. Hemstock
6 as to whether you agree with it or not?

7 A Well, having read through
8 this I think that there are several errors and mis-
9 leading information that has been introduced here
10 and unfortunately I don't have a good deal of material
11 with me, but I would like to try to correct some of
12 this regarding the situation of the wilderness
13 status, the legal situation with regard to the Arctic
14 Wildlife Range.

15 Now, this, regardless of the
16 testimony here that you are referring to, there was
17 some question as to how the range was established and
18 who was responsible for classification of wilderness
19 areas, etc., etc. Regardless of whether it was
20 established by Congress or by presidential edict
21 where the latter is the case, that is by an administrative
22 act, I should say, rather than by Congress, the
23 Arctic National Wildlife Range is a unit within
24 the Wildlife Refuge system of the United States,
25 administered by the U.S. Fish and Wildlife Service, as
26 a result of the Wilderness Act, and I believe that
27 that is 1969, but my memory is not too certain.
28 Dr. Calef thinks it is '64 in which case my memory
29 is very bad on that point.

30 At any rate, I am familiar

Calef, Lent
Cross-Exam by Bayly

1 with the Act and as a result of that Act, each unit
2 within the jurisdiction of the U.S. Fish and Wildlife
3 Service, as well as each unit within the jurisdiction
4 of the U.S. National Parks Service and the U.S.
5 Forest Service, must be studied for wilderness potential,
6 and of course this wilderness potential could be
7 any segment of these units or the entire unit.

Calef & Dent
Cross-Exam by Bayly

Recommendations on wilderness status are to be presented to Congress. Now, it is my understanding and also referring to the testimony previous -- I don't have the exact page here but someone commented, I believe it was either Mr. Hemstock or Dr. Banfield, that the proposals for wilderness were made a long time ago. Well --

Q 15068.

A Yes, sure, the original proposals were made a long time ago. The point is, however, that this is still an open matter in U.S. Fish & Wildlife Service, according to legislation it is required to study the area and make proposals, and to the best of my knowledge that study has been made. It was made in the early 1970's. The recommendations have not come from the Secretary of Interior to Congress by this time. The study has been made in recent times. Unfortunately, I do not have a copy of that study. I think that although it may be a little difficult, it should be attainable and I would hope that at some future date it could be introduced as a document into this Inquiry.

THE COMMISSIONER: You were refuting something Mr. Hemstock said, and I can't remember exactly what he did say. What was the point you were -- was he talking about the legal status of the refuge and so forth and so on?

A Well, there are numerous points I am trying to refute, and we could go through them one by one.

Calef & Lent
Cross-Exam by Bayly

1 Q Well, yes, please do; but
2 if you could just state the point he made. I don't have
3 that volume in front of me that you have, and if you
4 could state the point he made and then go on to refute
5 it.

6 A Yes.

7 Q Or to attempt to refute it.
8 Give your side of it.

9 A O.K., first on page 15067
10 there is a discussion of whether the State of Alaska or
11 the Federal Government of the United States is involved
12 in the process of determining whether this should be
13 a wilderness area, and I think that was brought out
14 clearly but just to again emphasize it, it is the U.S.
15 Government, even though Dr. Weedon and others at the
16 time were speaking with regard to the State of Alaska
17 favoring such an area, it's the U.S. Government that
18 has to make the decision, and Congress specifically.

19 Then on page 15068 Mr. Mar-
20 shall says, in reference to the proposal for wilderness
21 status, he says this:

22 "And it's a proposal made many years back,"
23 and my comment was that yes, it was made many years
24 back but Congress more recently has passed legislation
25 which requires the Department of Interior to make
26 recommendations on wilderness status to the Congress.

27 Now again on page 15068 there's
28 some discussion of Dew Line sites, and I know that
29 Dr. Banfield in another section of his testimony has
30 referred to this, and the implication being that the

Calef & Lent
Cross-Exam by Bayly

1 area isn't suitable for wilderness status because of
2 the presence of Dew Line sites on the coast. Well, I
3 think that I would suspect that any proposal for wilder-
4 ness area would probably excise the immediate coastal
5 area on which these Dew Line stations are located.
6 However, there is also a proposal which is either in the
7 process of being implemented or has been by this time,
8 to in fact turn over one of these Dew Line stations to
9 the U.S. Fish & Wildlife Service for purposes of
10 administering the Arctic National Wildlife Range and
11 carrying out studies on the Arctic National Wildlife
12 Range. This, of course, is the procedure usually used
13 in connection with wilderness areas, is that the
14 government agencies themselves which administer the
15 areas are not normally permitted to build facilities
16 in the wilderness area itself. So therefore they have
17 facilities located at the periphery of the area, and
18 that's exactly what such a Dew Line site would perform.

MR. BAYLY:

19 Q When you say, Dr. Lent,
20 that an area adjacent to the Dew Line site might have
21 to be cut out or excised from the wilderness area, do
22 you have an extended area in mind?

23 A Well, as I said, you know,
24 I don't have an exact one but I should think that you
25 know, perhaps just a mile or so back from the coast
26 would be sufficient, and again I haven't seen the
27 report done on the studies in the early '70's.
28 This is certainly personal opinion and would probably
29 be done regardless of the presence of the Dew Line
30 site because that does leave a route of travel for the

Calef & Lent
Cross-Exam by Bayly

1 people from Kaktovik, for example, passing up and
2 down the coast. But I, you know, offhand, can't envision
3 that a wider zone would be necessary.

4
5 Further in that testimony on
6 page 15070 there's some discussion of the point which
7 we got into this morning, Mr. Commissioner, as a result
8 of your question, and that is, is -- are there alternate
9 locations where such wilderness areas could be established
10 and my answer which I tried to convey was quite firmly
11 no, because of the present legal status of other areas
12 west-- talking now of Alaska, of course -- west of the
13 Arctic National Wildlife Range. None of these areas
14 are -- the Wilderness Act does not require, for example,
15 that the U.S. Navy study the Naval Petroleum Reserve
16 for possible inclusion in the wilderness/^{system}and as I dis-
17 cussed, there are no other lands along the Arctic Coast
18 of Alaska which are at all likely to receive wilderness
19 status. This is, of course, not guaranteeing that
20 wilderness status -- that is legal status as designated
21 by Congress -- is going to be received by the Arctic
22 Wildlife Range regardless of what the applicants do;
23 but I think the chances are significantly increased if
24 a gas pipeline is not built across the range.
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1 Then again, so this is,
2 my testimony is a direct contradiction to that of
3 Mr. Hemstock on page 15071 where he is asked the
4 question:

5 "I take it then that you don't regard the
6 Alaska Wildlife Range as the last chance
7 to select an Arctic Ocean Wilderness Park,
8 do you?"

9 And he answers:

10 "No."

11 And my answer would definitely be yes, at least with
12 regard to Alaska.

13 Now, there is a little
14 more to it than that, even, As perhaps has been
15 brought out before, the unique situation of the Arctic
16 Wildlife Range, in having a close juxtaposition
17 of the mountainous area to the coastal tundra area.
18 In other words, in a reasonably short distance,
19 one can pass from the Arctic coast itself through
20 the coastal tundra into the foothills and into the
21 mountains and this indeed is a wilderness hiking
22 experience which many people have availed them
23 of, I know several people that did it this summer,
24 and as such I can't think of anywhere else. Certainly
25 not in Alaska. Possibly in adjacent parts of the
26 Yukon where one can take a wilderness hike of a
27 few days duration and pass through all these different
28 types of wilderness terrain vegetative features.

29 I understand by the
30 way that there may be a report being prepared on

Lent, Caled
Cross-Exam by Bayly

1 recreational use of this area by Renewable Resources
2 and they may have some more statistics on that type
3 of use at a future date.

4 Perhaps it would be appropriate
5 here to also comment on the wilderness values of the
6 Canning River. They certainly are -- the Canning
7 River drainage certainly does represent an area of
8 great beauty, of great wildlife value, except for
9 perhaps a lower part of it, great wilderness potential.
10 I don't think it has been brought out in testimony
11 that there are oil leases on the lower part of the
12 Canning River, in fact a couple of these do extend,
13 I believe across the boundary into the Arctic Wildlife
14 Range, I am not sure of the legal basis for that, but
15 apparently they were blocks of leased land in which
16 the completion of the blocks in the lease was permitted.
17 Other than that, the Canning River does have all the
18 values which I mentioned and certainly with
19 regard to the general wildlife values, sheep populations
20 that the applicant has brought forward, it is quite
21 true.

22 However, we do have very
23 comparable areas in the central part of the Brooks
24 Range, particularly in the gates of the Arctic National
25 Park proposal which we talked about this morning. So
26 again, it is a question of, of course, I personally
27 would regret to see these values in the Canning
28 River disrupted. We do have in that case rather
29 equivalent areas elsewhere in the Brooks Range of
30 Alaska.

Calef, Lent
Cross-Exam by Bayly

1 Q Now, when you are
2 talking about uniqueness too, Dr. Lent, I take it that
3 you distinguish between this coastal tundra that you
4 have described in your evidence and alpine tundra
5 areas?

6 A Yes, sure, there are
7 various biological differences between the two and
8 certainly aesthetic differences, differences of a
9 variety of types.

10 Q But in terms of pre-
11 serving an area of coastal tundra, what you are
12 saying is that there is only this one opportunity
13 at least in Alaska of doing so and that is within the
14 Wildlife Range?

15 A Yes, quite definitely,
16 and of course it is again the only one with caribou
17 calving and large aggregations of caribou such as
18 Dr. Calef mentioned, brought out very well.

19 Q Yes.

20 A Then also of course I
21 should mention its, you know, international values.
22 I think that establishment of an international area of
23 this nature would be of mutual benefit to people of
24 both nations.

25 Q Now, you have referred
26 in your evidence to the monitoring or regulatory
27 authorities' anagram is JAFWAT, and you mentioned that
28 although it is controlling at least to the best of
29 its ability the construction of the pipeline itself,
30 it is not controlling the area of gathering and

processing systems --

A That is correct.

Q -- and you have suggested in your evidence and by showing us some slides that where this protection does not exist, terrain damage at least has occurred and perhaps other damage that might not have occurred had regulations extended into the producing field itself.

A Yes, that is correct.

Of course, there are laws on the books and reasonably good ones which are aimed at preventing this sort of damage in the operator's oil fields and by and large, I think there has been reasonable compliance. The difference is, of course, is in the staffing and the ability to enforce and monitor this type of thing. The State of Alaska which has responsibility for the oil fields, of course, is feeling impacts, financial impacts of all sorts, in part, as a result of rapid development and I think basically it is a problem of not having personnel to first of all monitor the situation, secondly enforce it, and thirdly, deal with the problem in a legal sense, that is, in the court system. Whereas, the situation with JAFWAT is quite different since to a large extent that effort is being financed by industry, indirectly.

Q Would you recommend that as far as a gas pipeline was concerned, whether it were constructed in the State of Alaska or through the Yukon^{and} the Northwest Territories as well, that it regulate -- that both the processing, gathering and

Calef, Lent
Cross-Exam by Bayly

1 the trunk pipeline be regulated by the same authority
2 rather than a separate one?

3 A Yes, by and large I would
4 recommend that they be included as one sort of indivisi-
5 ble unit of the same process, yes.

6 Q Right. To your knowledge,
7 are there, at least on the environmental side, studies
8 being conducted to monitor the Alyeska project to
9 see what sorts of effects are being generated on
10 both wildlife, plants and the terrain itself?
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Calef & Lent
Cross-Exam by Bayly

2 A You are asking about
4 research, you are asking about research as opposed to
3 actual stipulation, living up to stipulation\$,

4 Q That's correct, the
5 actual effects predicted and unpredicted that occur
6 during and after construction.

7 A Yes, there's a -- and I
8 think I better restrict my answer there strictly to
9 wildlife, particularly large mammals. There is a limited
10 effort, primarily looking at caribou and moose. There are
11 a small number -- I don't have the figures, I suppose
12 three or four research biologists, emphasizing research
13 biologists -- with the Alaska Department of Fish & Game
14 who are responsible for trying to look at these effects,
15 and we also have -- by "we" I mean my department and
16 group at the university -- have some funding for that
17 purpose and are supporting some graduate students in
18 that type of research. It's not, at least with regard
19 to large mammals, a particularly large scale undertaking,
20 certainly there's nowhere near the amount of money
21 is being spent now as was being spent say in support of
22 the research that we did on the simulation studies
23 before construction.

24 Q And is
25 this financing coming from the industry itself, or is
26 this government financing that is involved in the
27 limited monitoring that you have described?

28 A O.K., I believe and again
29 I must qualify that I'm not certain of this, but I
30 believe that the research effort of the Alaska Department

Calef & Lent
Cross-Exam by Bayly

of Fish & Game with regard to caribou and moose is also being funded through Alyeska. Now the work now being done at least that I am aware of in the university again just with regard to large mammals, is being funded by, primarily by government agencies.

Q Would you recommend that if it had to be done again, that it include studies of other than the two large mammals that you've mentioned, to include fish and birds?

A I have the impression that there is - - they are not looking sufficiently at the larger carnivores and the effects there. We do have by the way research projects going on involving foxes on the North Slope. I didn't mention those species, but we are doing a bit of work there, supported by the U.S. Government. But I have the general impression that the management agencies are not doing much research specifically directed to impacts on large carnivores.

Q Now on page 14 of your direct evidence you've referred to the fact in the first paragraph that some employees have had their employment terminated because they report environmental insults to surveillance or agency personnel. Can you give us an example of that sort of situation? I understand there was an incident with welding that came to light very recently.

A Yes, that would be one case. Again my information comes from reading the newspaper. There are a few Court cases pending now at

Calef & Lent
Cross-Exam by Bayly

the moment, I believe; but they have not been resolved.

In the case of the welding situation, it was discovered that -- and I believe the initial discovery came from an employee of one of the sub-contractors of Alyeska who reported it -- that several of the X-rays of pipeline welds which were required as a stipulation had been falsified, primarily I believe by placing duplicates of acceptable welds, X-rays showing acceptable welds or replacing these with X-rays of other welds. The result of this, as I understand, is that quite a few segments of pipe will have to be -- either have been or will have to be dug up and re-X-rayed. Now I think this is a good and interesting situation because, if in the hearings that took place before the Department of Interior, before construction of the Trans-Alaska Pipeline system, if anyone let's say from the Sierra Club had raised the question of an incident of this sort occurring, I'm sure there would have been an indignant response, and in very good faith, I'm sure, from the applicants in that case. This is the sort of thing that nobody really felt would occur but somehow in a project of this magnitude, where you're dealing with contractors and sub-contractors and sub-sub-contractors under very strenuous pressures to meet deadlines and perform, this type of incident has certainly occurred.

Q All right, are there other examples that you can refer to, not necessarily of welding, but of other kinds of things that despite the fact that there are regulations and were hearings,

Calef & Lent
Cross-Exam by Bayly

1 have gone on, to everybody's surprise?

2 A Well, there have been
3 numerous cases of course of oil spills, fuel spills.
4 This is of course not crude oil, but products used in
5 camps. Now I feel rather reluctant to go in it in
6 any detail on that. Again I can only strongly recommend
7 that people who have been intimately involved with in
8 these matters in Alaska be brought before this Inquiry,
9 if at all possible, at some time in the future. May I --

10 Q Yes , go ahead.

11 A -- say some more? I am a
12 little more, I think, able to speak on the matter of
13 stipulations regarding feeding, attraction of wildlife,
14 this type of thing since I have read through, tediously,
15 all the reports filed by the JAPWAT surveillance teams
16 for about the past six months, and there in these
17 reports just countless cases of violation of these
18 stipulations. Of course, I refer to this morning when
19 I say if any action at all is taken in these cases,
20 the action is usually not a criminal charge, but simply
21 dismissal of the employee and that is usually just
22 a short term solution.

23 Q It's really a penalty
24 in the number of days he misses at work, I expect from
25 the way you put it that he'd go back to the Union Hall
26 and get hired on either by the same contractor or a
27 different one.

28 A So far as I know, and of
29 course in many cases they don't really mind missing a
30 few days of work.

Calef & Lent
Cross-Exam by Bayly

1 Q Yes. Can you recommend
2 not just ways in terms of penalties, but anything that
3 you may have thought of that would help alleviate the
4 problem of the temptation that people will obviously have
5 to feed animals that are attracted to the project, or
6 to get so close to them that they will either be hurt
7 or the animal will have to be destroyed.

8 A Well, I have the impres-
9 sion that a lot of the initial attraction of the animals
10 is not by people feeding them, but by -- and this is
11 kind of a generalization -- but a lot of it is garbage
12 and stuff that's, you know, has been left around. So
13 certainly one of the most obvious things that one can
14 do is to have strict regulations in this regard, and
15 also there's been a lot of problems with not getting
16 sufficient skirting around the camp, trailer camps
17 and this sort of thing. Animals have been going under
18 the buildings, using them as shelter. So that's
19 certainly one, you know, that's an easier way, an
20 easier more partial solution is to deal with the
21 disposal of garbage. As far as dealing with the personal
22 element and the personal desire of people to feed
23 animals for photographing purposes or for whatever
24 reasons they have, that's much more difficult to deal
25 with. I feel that it should be dealt with more as a
26 criminal charge.

Lent, Calef
Cross-Exam by Bayly

1 Q Now, with regard to
2 hunting as opposed to photographing animals, are there
3 regulations on the project which are working in the
4 Alyeska situation?

5 A Yes, as far as I know
6 those have worked quite well. Now, of course, we do
7 have sections of the pipeline which are, you know,
8 adjacent to the public road system, adjacent to the
9 settlements, and in some cases there have been
10 animals that were initially attracted to the camps
11 that then became easy targets, shall I say, for
12 people who are legally allowed to hunt. But as far
13 as the northern portion, the isolated portion of
14 the highway, I don't believe that there has been much
15 of a problem there.

16 Q Now, my understanding
17 of the regulations in Alaska about caribou hunting
18 are that there are few, if any, limitations of
19 hunting north of the Yukon River. Am I correct in
20 that?

21 A That is quite correct.
22 Talking specifically about the Porcupine and the
23 Arctic herd, they are at present open to hunting
24 unlimited by any resident of Alaska year-round without
25 restriction to age or sex of the animal.
26 Furthermore, it is still legal at this moment to
27 sell caribou meat within the game management units
28 which it is shot, that is essentially north of Yukon.
29 Caribou meat is, at least has been available for sale,
30 for example, in stores in Barrow.

Calef, Lent
Cross-Exam by Bayly

1 Q And I gather that these
2 regulations were in effect prior to the commencement
3 of construction of the Trans Alaska Pipeline system?

4 A Yes, that is correct,
5 and of course these are state regulations, not
6 federal and the State of Alaska is, by its Constitution,
7 unable to distinguish or discriminate on the basis of
8 race, so, therefore, all residents of the State are
9 subject to the same regulation.

10 Q So without changing
11 the residency requirement, they couldn't do anything
12 about it, in your opinion then?

13 A I am sorry, I didn't
14 quite follow you.

15 Q That without changing
16 the length of residency requirement, this would be a
17 very difficult thing to --

18 A Very difficult. In
19 fact, if it's changing, it is shortening if anything.

20 Q Yes. I understand,
21 Dr. Lent, that you have had an opportunity to look
22 at the direct evidence of Dr. Banfield and do you
23 have a copy of that before you, sir ?

24 A No, I don't.

25 Q All right. I will
26 give you the reference and then give you my copy
27 here. It is with regard to the acceptability of the
28 environmental impact and it is found on page nine of
29 his direct evidence, and in the second paragraph Dr.
30 Banfield said, and I will quote this for the benefit

1 of the record:

2 "I favour the tests for the acceptability
3 of expected environmental impacts by
4 comparing the predicted environmental
5 effects of the proposed human activity
6 with the observed environmental effects of
7 natural disturbances. At present this
8 test is only in a conceptual stage and
9 can only be used with the method of direct
10 observation."

11 In light of your evidence on page 7, the second paragraph
12 on that page, I wonder if you would care to comment
13 on that evidence of Dr. Banfield's?

14 A Well, first of all, it
15 would be very nice if we could say something about the
16 impacts -- I presume what he says is "expected" --
17 okay, "natural" disturbances -- I am not quite sure
18 what he means by "natural" disturbances, but let's
19 say an excessively heavy snowfall, excessively late
20 melt which delayed animals arriving on the calving
21 grounds, I assume this is the sort of thing that he
22 is talking about.

23 Well, first of all, as Dr.
24 Calef has quite eloquently pointed out, we don't have
25 any data on these natural events. We don't have any
26 idea that I can think of, of the proportion of mortality
27 in any caribou population due to late arrival on the
28 calving grounds. The only thing that comes to mind
29 offhand is some of the C.W.S. work on mortality on
30 calving grounds, which they felt there was a fairly

Calef, Lent
Cross-Exam by Bayly

1 strong relationship with severe weather, so even if
2 we wanted to do as Dr. Banfield suggests, and compare
3 these environmental impacts, I presume resulting from
4 man is what he means, with natural impacts, we don't
5 have the data on the natural impacts to do this.

6 Secondly, the point which
7 I attempted to bring out on, was it page 7 -- and
8 Dr. Calef also referred to, was that these effects
9 are cumulative, they must be summed. In short, it
10 would be nice to compare the two, but I am not con-
11 vinced of its value if we could sum up total mortality
12 due to a variety of natural factors and we could
13 then say and then also predict accurately the sum
14 mortality due to man-made factors and if we found
15 the first were, you know, in the order of a magnitude
16 of twenty or thirty times a second, that would
17 certainly be of value, but I think as Dr. Calef
18 has brought out ^{quite} well, the state of the art is just
19 nowhere close to being able to do that.

20 Q YOU have discussed in
21 your evidence the Arctic herd, or Western Arctic herd,
22 and I wonder if there has been any recent assessment
23 of that herd and any declines or increases over the
24 past few years that have been noticed?

25 A Well, until last summer
26 the picture was rosy. Consistently since my studies in
27 the early '60's and later reasonably accurate study
28 census done in 1970, it appeared that we had 200,000
29 or an excess of 200,000 animals in that sub-population.
30 Last summer, the Alaska Department of Fish and Game failed

Calef, Lent
Cross-Exam by Bayly

1 to obtain a good aerial photographic census of the
2 population which has, as I am sure, been brought out
3 before, the best method for censusing. They failed
4 partly because the post-calving movements seemed
5 to be quite different from previous years and partly
6 because of weather conditions. They were never able
7 to locate any more than a small portion of the herd.
8 This winter they have attempted to come up with at
9 least a crude estimate of caribou numbers in the
10 Arctic herd and they simply haven't been able to
11 find them. I think that even with some extrapolations
12 they have made, they haven't been able to come up
13 with much over 100,000 animals. I personally, from
14 personal experience feel that any attempt at even
15 crudely estimating numbers in winter is questionable,
16 but the order of magnitude of difference here is
17 100% and I think that from the little information
18 last summer and the information this winter, it
19 certainly does appear that that population has
20 declined since 1970. The rather anomalous result --
21 observation is, though, that they are still penetrating
22 very far into their southern range all the way down
23 to the base of the Seward Peninsula. So the
24 periphery, the range, does not seem to have started
25 to shrink in yet, such as we have seen with other
26 declining populations. So we do know that there is
27 very heavy harvest, extremely heavy so far this
28 winter, that is, primarily by natives and villages in
29 northwestern Alaska. We do also have some indications
30 that there has been an increase in wolves on the North

Calef, Lent
Cross-Exam by Bayly

1 Slope. This population, by the way, also has
2 brucellosis endemic to it, this could possibly
3 also be a factor to be associated with the decline.
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Calef & Lent
Cross-Exam by Bayly

1 MR. ANTHONY: Dr. Calef wanted
2 to comment on that also.

3 WITNESS CALEF: Yes, I just
4 wanted to say that this emphasizes the point I made
5 this morning about the necessity of having continuity
6 in population estimates, if one is going to account for
7 changes in populations, and here's an example in which,
8 if we take the data at face value, there's apparently
9 been a decline in excess of 50% and there's a five-year
10 gap in our knowledge so we don't know whether it's
11 been a steady decline over five years, or whether it's
12 been a sudden drop.

13 MR. BAYLY: Q All right, and
14 I gather, Dr. Lent, you don't even know the extent of
15 the drop because there hasn't been success in photograph-
16 ing enough of the herd to say exactly what that drop
17 might be.

18 WITNESS LENT: Yes, that's
19 quite correct, and I can only agree with what Dr. Calef
20 said. The manpower situation in the Alaska Department
21 of Fish & Game, being what it is, they have essentially
22 been forced to sort of switch from herd to herd over
23 the years, rather than continually monitoring all the
24 herds, and in fact they switched of course -- switched
25 a lot of their effort to the Porcupine herd for
26 obvious reasons in the early '70's.

27 THE COMMISSIONER: Q Dr.
28 Calef, I gather from your testimony that in Canada we
29 only began to examine the -- to study the caribou to
30 find out where their calving grounds were, where their

Calef & Lent
C ross-Exam by Bayly

1 migrating routes were, where they spent their winters
2 and only began to seek to determine how many of them
3 there were after the war when Dr. Banfield got started.
4 What I'm saying is, have we only been studying these
5 animals for about 25 years, is that about it?

6 WITNESS CALEF: Certainly with
7 any success only for 25 years, and depending on what
8 your criteria of success is, maybe for a lot shorter
9 time than that. There were lots of previous observations
10 of caribou, but because of the wide ranging nature of
11 these animals and their migrations, the only successful
12 way that you can observe them is by aircraft, and the
13 other studies of course were done say along river
14 systems like the Phelon River, there was an investiga-
15 tion of the Phelon River when it became a game
16 sanctuary, and observations are made of caribou, estimates
17 were made, for example, by Murie, by counting the animals
18 that crossed a highway from a vantage point; but really
19 the only way that you can obtain accurate population
20 estimates is by either aerial transects, or even better
21 by actual photos of the whole herd. The only way you
22 can follow migrations is by flying day after day as the
23 caribou proceed on their migrations and just mapping
24 them. So yes, 25 years essentially encompasses
25 the scientific studies of the caribou herd.

26 Q Well, Dr. Lent, is the
27 same thing true in Alaska?

28 WITNESS LENT: Yes, quite
29 much the same. Classic studies which Dr. Calef just
30 referred to by Olaus Murie in the 1930's were quite

Calef & Lent
Cross-Exam by Bayly

1 remarkable considering the conditions under which he
2 had to work, and travelling hundreds of miles by dog
3 team. Essentially yes, modern studies of caribou in
4 Alaska probably got under way approximately the same
5 time, maybe a little bit later than Dr. Banfield's.

6 Q And the astonishing thing
7 is that that Arctic herd in north-west Alaska, you
8 call it the Arctic herd, given the figure of 200,000
9 animals, is the largest herd in North America; and yet
10 this really fantastic fluctuation in population in
11 very recent times is not confirmed and if it did occur
12 isn't really adequately explained in any event. Is
13 that about the size of it?

14 A Yes, I'd say that it
15 probably has occurred. The extent of decline has
16 certainly yet to be defined. That can be defined more
17 precisely, but the causes may not be.

18 MR. CALEF: I might just make
19 one more interesting point here. I spoke this morning
20 about the possibility of natural fluctuations in
21 caribou herds. If you look at my table showing the
22 population size and population densities of the various
23 caribou herds in North America, which was tabled with
24 the Environment Protection Board Reports --

25 Q Yes, I saw that.

26 A -- the Arctic herd of
27 Alaska had the highest population density of any major
28 herd in North America, so potentially one could say
29 that one might have anticipated a decline in that
30 herd, a natural decline in that herd. Now whether

Calef & Lent
Cross-Exam by Bayly

1 anything else helped it along, we don't know, but if
2 there was any herd that I would have anticipated a
3 decline in, it would be that herd.

4 Q That -- we looked at
5 your report in Volume 4, it's sort of a study paper --

6 A It's a research report,
7 yes.

8 Q -- we were looking at that
9 just the other day here and I don't have it in front
10 of me, and you wrote that only two or three years ago
11 and you had the Arctic herd down at something like
12 200,000.

13 A Well, the last figure I
14 had was the 1970 estimate and it was, I think, 242,000.
15 Actually I think I've got a copy, if you want to check
16 it.

17 Q Well --

18 WITNESS LENT: That's correct,
19 240,000.

20 Q -- all right.

21 MR. BAYLY: I just have one
22 more question after Dr. Calef has found that number.
23 Mr. Commissioner, I have only set about today to cross-
24 examine Dr. Lent in the hope that we might finish his
25 cross-examination so that he wouldn't have to come back.
26 I'm not prepared to cross-examine Dr. Calef now.

27 THE COMMISSIONER: Fine. Well,
28 Dr. Lent is now agreeable to coming back, but we'll just
29 carry on in this fashion, and you can cross-examine Dr.
30 Calef in January.

Calef & Lent
Cross-Exam by Bayly

1 MR. BAYLY: Thank you.

2 THE COMMISSIONER: Well, let's
3 stop for coffee now.

4 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

5 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

6 THE COMMISSIONER: You don't
7 have to put this on the record, but Mr. Bayly's last
8 question.

9 MR. BAYLY: Q Dr. Lent, in
10 summing up your reasons for preferring the Fairbanks
11 route, you make rather sad reference to the fact that
12 the quality of life in Fairbanks has deteriorated marked-
13 ly. I assume that is one of the results of pipeline,
14 among other things. Would you expand on that and
15 give us an idea of what sorts of impacts there have been
16 in Fairbanks that have affected your community and
17 you and your family?

18 WITNESS LENT: Yes, of course
19 again I'm speaking just as a Joe Blow citizen and
20 there are lots of statistics available on this subject,
21 but I'll, as you suggest, speak just from a personal
22 viewpoint.

23 In spite of the delays which
24 were caused in commencing construction of the Trans-
25 Alaskan Pipeline, it would appear that local government
26 and state government were still not at all ready to
27 deal with the impacts on communities such as Fairbanks.
28 In fact, one could ask whether some communities, whether
29 it's at all possible in some communities in certain
30 situations to deal with such impacts. Fairbanks may

Calef & Lent
Cross-Exam by Bayly

1 capacities of Fairbanks and the surrounding area are
2 right at the margin, that is the demand is right at
3 the margin of their capacity to produce. We've already
4 had this winter a couple of short outages and the
5 producers of electricity themselves are predicting a
6 strong possibility of major outages later in the
7 winter.

8 The telephone system is
9 totally overloaded. This impact is not only on one's
10 personal life but on one's professional endeavors.
11 I think my secretary spends probably an hour or two
12 every day trying to place long-distance phone calls
13 on overloaded circuits.

14 The quality of services avail-
15 able is also impacted because of the rapid turnover in
16 personnel. Obviously, particularly Civil Servants and the
17 like on fixed incomes find greater economic opportunities
18 elsewhere. This, of course, has impacted not only
19 local communities but on state agencies as well. There's
20 been quite a few state employees have gone to work for
21 industrial firms in environmental capacities.

22 The university, for example,
23 has suffered from extremely high turnover of personnel
24 in secretarial, maintenance areas. People come, say,
25 "I need a job," and two weeks later after you get
26 them trained, it's, "Goodbye, I've got a job with
27 industry which pays twice as much and has lots of
28 overtime," etc.

29 There has of course been a
30 major increase in crime rate. This fortunately hasn't

Calef & Lent
Cross-Exam by Bayly

1 impacted on me personally. I can only recommend that
2 statistics on this and all these impacts are being
3 compiled by people such as the Fairbanks North Star
4 Borough Impact Office and either these statistics
5 should be obtained ~~or~~ the personnel involved should be
6 invited if possible to participate at some point in this
7 Inquiry.

8 Of course, the housing, heating
9 costs in particular have skyrocketed because of the
10 shortage of housing. So I guess that's probably enough
11 to indicate generally what I refer to as a deteriorating
12 quality of life.

13 Q Has it done anything to the
14 supply of goods that you were accustomed to be able to
15 purchase?

16 A Initially yes, definitely.
17 There were shortages of a variety of things in Fairbanks.
18 I think this has probably been alleviated now.

19 Q All right, and then how
20 did Fairbanks compare in size to Yellowknife prior to
21 the beginning of the pipeline development?

22 A Well, let's see.

23 Q Yellowknife being some-
24 where between eight and 10,000 people.

25 A Well, it was quite a bit
26 bigger than that even before the development, yes.
27 On the order of twice as big, and I believe now the whole
28 area, including Fairbanks, the Borough and surrounding
29 suburbs, are approaching 50,000.
30

Calef, Lent
Cross-Exam by Bayly

1 THE COMMISSIONER: Mr. Bayly,
2 I think that we will be covering all of this ground in
3 Phase IV, but it has been useful to have Dr. Lent using
4 a fairly broadish brush to paint the picture for us.

5 MR. BAYLY: Yes, I hadn't
6 intended to go any farther into this, sir. Those are
7 all the questions that I have at the present, sir, and
8 I had intended to cross-examine Dr. Calef upon his
9 return in January, if that is convenient.

10 THE COMMISSIONER: Well,
11 that will be no doubt a slashing adversarial cross-
12 examination.

13 MR. BAYLY: My usual, sir.
14 Thank you, gentlemen.

15 MR. MARSHALL: Mr. Commissioner,
16 I have distributed to counsel and have left with
17 Ms. Hutchinson a report of LGL entitled, "Ornithological
18 Studies, Cross-Delta Route, " December 1975. The
19 report really is five separate reports, sir. The
20 first three reports are LGL's research reports
21 from this year's work. The snow goose surveys and
22 the ground transect reports are final reports. Un-
23 fortunately, they have not had time to complete the
24 aerial survey report so they have updated a draft
25 or interim report and have authorized its release
26 today. The data are there, but the discussion
27 derived from the data is not, and they anticipate
28 having the final report in my hands around January
29 the 20th.

30 The other two reports

1 that are found in this volume have arisen out of
2 the cross-delta work undertaken by LGL. The
3 comparison report compares the two routes from an
4 ornithological point of view and presents their
5 recommendations. The other report discusses the
6 Mackenzie delta as a whole and their concerns for it.
7 So that volume is entered as the next exhibit, sir,
8 and will be spoken to at the cross-delta evidence
9 phase by Arctic Gas.

10 Dr. McCart had sent materials
11 up from Calgary today. Unfortunately PWA has misplaced
12 them and they did not arrive with this other material.
13 We have some hope that it will be here at 5:15, and
14 if so, I will distribute it. Mr. Dabbs has had
15 some difficulty completing the vegetation work in
16 time. He hopes to have it done tomorrow, or at the
17 latest, Monday, and it will be distributed by mail
18 to the participants, various counsel they represent
19 and finally, sir, there is a filing which is to go
20 to the Minister and also to the N.E.B. relating to
21 the adoption of the cross-delta, dealing with the
22 extension of the line to the Shell plant and the
23 realignment near Parson's Lake. I haven't seen it.
24 There may be some other additional matters in it. I
25 don't know. I understand that that is in the final
26 stages of being assembled and that will be distributed
27 as soon as it is available to the counsel and the
28 participants by mail. Thank you, sir.

29 THE COMMISSIONER: Thank you,
30 Mr. Marshall.

1 MR. MARSHALL: Sir, I gather
2 that Mr. Bell doesn't have any cross-examination
3 for this panel. As we have discussed with Commission
4 Counsel, Arctic Gas's cross-examination of the panel
5 would undoubtedly run beyond the limit of the time
6 available today, and for that reason we would like to
7 defer that until the panel is recalled. I gather as
8 well that counsel wish to meet to discuss a number
9 of matters relating to the scheduling of our proceedings
10 in the New Year and I think that that will probably
11 exhaust the day and the year.

12 MR. RYDER: So you have an
13 unanimous request for an adjournment.

14 THE COMMISSIONER: Yes, well,
15 all right, we will adjourn then. I just want to
16 thank you, Dr. Lent, for coming all this way and I am
17 very pleased that you will be returning again in the
18 New Year, and you, too, Dr. Calef, having come all the
19 way from Fort Smith, I understand. So we will adjourn
20 then until three weeks Monday at one o'clock and I
21 know that we will all return rested, refreshed and
22 ready to move rapidly toward the conclusion of the
23 Inquiry. So happy, happy Christmas.

24 ("ORNITHOLOGICAL STUDIES, CROSS-DELTA ROUTE" L.G.L.
25 LIMITED, DECEMBER 1975, MARKED EXHIBIT 395)

26
27 (PROCEEDINGS ADJOURNED TO JANUARY 12, 1976)
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347

M835

Vol. 106

AUTHOR

Mackenzie Valley pipeline inquiry:

TITLE

Vol. 106

18 Dec., 1975

347

M835

Vol 106

CA1
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MACKENZIE VALLEY PIPELINE INQUIRY

Government
Publication

IN THE MATTER OF THE APPLICATIONS BY EACH OF

(a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A
RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS
CROWN LANDS WITHIN THE YUKON TERRITORY AND
THE NORTHWEST TERRITORIES, and

(b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY
THAT MIGHT BE GRANTED ACROSS CROWN LANDS
WITHIN THE NORTHWEST TERRITORIES

FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND
ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION,
OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE
PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

January 12, 1976.

PROCEEDINGS AT INQUIRY

Volume 107

347
M835
Vol. 107

CANADIAN ARCTIC
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APPEARANCES:

Mr. Ian G. Scott, Q.C.,
Mr. Stephen T. Goudge,
Mr. Alick Ryder and
Mr. Ian Roland for Mackenzie Valley Pipeline
Inquiry;

Mr. Pierre Genest, Q.C.,
Mr. Jack Marshall, and
Mr. Darryl Carter for Canadian Arctic Gas
Pipeline Limited;
Mr. Reginald Gibbs, Q.C.,
Mr. Alan Hollingworth &
Mr. John W. Lutes, for Foothills Pipe Lines Ltd.;

Mr. Russell Anthony &
Pro. Alastair Lucas for Canadian Arctic Resources
Committee;

Mr. Glen W. Bell and
Mr. Gerry Sutton, for Northwest Territories
Indian Brotherhood, and
Metis Association of the
Northwest Territories;

Mr. John Bayly
or
Miss Leslie Lane for Inuit Tapirisat of Canada,
and The Committee for
Original Peoples Entitle-
ment;

Mr. Ron Veale and
Mr. Allen Lueck for The Council for the Yukon
Indians;

Mr. Carson H. Templeton, for Environment Protection
Board;

Mr. David Reesor for Northwest Territories
Association of Municipal-
ities;

Mr. Murray Sigler for Northwest Territories
Chamber of Commerce.

I N D E XPage

WITNESSES FOR ENVIRONMENT PROTECTION BOARD:

Carson H. TEMPLETON

K.M. ADAM

Ian McTAGGART-COWAN

N.J. WILIMOVSKY

D.W. CRAIK

L.C. BLISS

E. GOURDEAU

- Cross-Examination by Mr. Anthony

16283

Stan THOMSON

16341

- Cross-Examination by Mr. Bayly

16365

EXHIBITS:

396 "New Directions in Northern Policy Making"

by Usher & Noble , December 3 , 1975

16283

397 "The Past 5 Years, Lessons Learned &
their effect on Mackenzie Delta Planning"

by E.B. Peterson, December 3, 1975

16283

398 "Offshore Drilling in the Canadian Arctic"

by D.H. Pimlott

16283

399 "The Physical Invasion of the Mackenzie
Delta" by C.H. Templeton, Dec. 3/75

16283

400 Opening Remarks by Dr. A.R. Thompson

16283

401 Maps on Terrain, Vegetation & permafrost

16283

1 Yellowknife, N.W.T.

2 January 12, 1976.

3 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

4 MR. SCOTT: Mr. Commissioner,
5 any time you're ready, we're ready to begin.

6 THE COMMISSIONER: Well, we'll
7 call the Inquiry to order and Mr. Scott?

8 MR. SCOTT: I should say, Mr.
9 Commissioner, that we have agreed to begin with the
10 cross-examination of the Environment Protection Board
11 panel. When that has been completed we will revert to
12 where we were before Christmas, that is with Mr. Anth-
13 ony's evidence in Phase 3.

14 MR. ANTHONY: Mr. Commissioner,
15 before I begin the cross-examination, there are a few
16 other items I'd like to handle, first of all I would
17 like to introduce to yourself, sir, and to this
18 Inquiry Mr. Garth Evans, who is with me today. Mr.
19 Evans has been retained by C.A.R.C. to do some
20 research work basically on a long-standing landing
21 study that commenced a number of years ago and is a
22 continuing project, and he will be appearing hopefully
23 from time to time before this Inquiry both as an advisor
24 and as a counsel.

25 I'd also like to advise you,
26 sir, and the Inquiry that the Northern Assessment Group
27 has a new director as of January 1st of this year. He
28 is Mr. Doug Pimlott. Dr. Pimlott has had extensive
29 experience in the north, having lived and worked in the
30 Mackenzie Delta area in particular, and he has taken a

1 six-month leave of absence from his teaching duties at
2 the University of Toronto and will be working full-time
3 as the director of the Northern Assessment Group provid-
4 ing research and other assistance to myself and other
5 counsel appearing before you.

6 Mr. Commissioner, also before
7 Christmas I advised that there was a conference held by
8 the Canadian Arctic Resources Committee on the Macken-
9 zie Delta, the conference which dealt with the Mackenzie
10 Delta and a look at the Mississippi Delta in the way of
11 comparison and some offshore examination of the Norwegian
12 experience, there are a number of papers presented to
13 that conference, and as I answered before Christmas, I
14 would like to table these as -- with this Inquiry for
15 the information of counsel.

16 One is entitled:

17 "New Directions in Northern Policy-Making,
18 Reality or Myth,"

19 by Mr. Peter Usher and Miss Gail Noble

20 Another one is:

21 "Offshore Drilling in the Canadian Arctic,
22 Elements of a Case History,"

23 by Dr. Pimlott.

24 A third,

25 "A physical invasion of the Mackenzie Delta,"
26 by Mr. Carson Templeton.

27 Further,

28 "The past five years, lessons learned and
29 their effect on the Mackenzie Delta Planning,"
30 by Dr. Everett Peterson.

1 And finally, the opening
2 remarks of the chairman of the Canadian Arctic Resources
3 C ommittee, Dr. Thompson.

4 I should say that there are a
5 number of other papers presented. These were not prepared
6 by the authors in advance, the transcript is being pre-
7 pared and I've asked that that information be made avail-
8 able as soon as possible to this Inquiry in the event
9 participants would like to examine them and perhaps
10 comment on them during the delta phase.

11 The typing, I understand, is
12 being completed, and we're merely waiting for the authors
13 corrections and approval and those will also be submitted
14 and filed before the Inquiry.

15 In addition, before Christmas
16 C anadian Arctic Resources Committee had called Mr.
17 Zoltai and as part of his evidence he described the
18 series of maps on terrain susceptibility, and I indicated
19 that those would be filed in due course and I now have
20 obtained them and I'd like to file these as the next
21 exhibit in the Inquiry, material filed by Mr. Zoltai.

22
23 Finally, in the
24 list of reports that was provided by Canadian Arctic
25 Resources Committee there were three volumes which were
26 not available at that time. I now have them with me,
27 they're quite extensive; and I will be leaving them here
28 and would ask that any members -- any of the participants
29 who would like to have copies of them, to make whatever
30 photo copies they require in whatever way we can accomplish

Templeton, Adam, McTaggart-Cowan
Wilimovsky, Craik, Bliss,
Gourdeau - Cross-Exam by Anthony

1 that at the Inquiry. Thank you, Mr. Commissioner.

2
3 CARSON H. TEMPLETON,
4 K.M. ADAM
5 IAN McTAGGART-COWAN,
6 N.J. WILIMOVSKY
7 D.W. CRAIK
8 L.C. BLISS
9 E. GOURDEAU, resumed:

10 CROSS-EXAMINATION BY MR. ANTHONY:

11 Q Gentlemen, I would now
12 like to ask some questions of you arising out of the
13 evidence you led before this Inquiry particularly center-
14 ing around your appearance in June.

15 Mr. Templeton, I perhaps will
16 address my questions generally to you and with the
17 request that any other members of the panel jump in
18 if they have anything they wish to add, or you can
19 certainly refer any questions that you think would be
20 more appropriately answered by others.

21 ("NEW DIRECTIONS IN NORTHERN POLICY MAKING" BY
22 USHER & NOBLE, DECEMBER 3, 1975, MARKED AS EXHIBIT 396)

23 ("THE PAST 5 YEARS, LESSONS LEARNED & THEIR EFFECT ON
24 MACKENZIE DELTA PLANNING" BY E.B. PETERSON, DECEMBER 3,
25 1975, MARKED AS EXHIBIT 397)

26 ("OFFSHORE DRILLING IN THE CANADIAN ARCTIC" BY D. H.
27 PIMLOTT, MARKED AS EXHIBIT 398)

28 ("THE PHYSICAL INVASION OF THE MACKENZIE DELTA" BY
29 C. H. TEMPLETON, DEC. 3, 1975, MARKED AS EXHIBIT 399)
30 (OPENING REMARKS BY DR. A. R. THOMPSON, MARKED AS
EXHIBIT 400)

(MAPS ON TERRAIN, VEGETATION & PERMAFROST, MARKED AS
EXHIBIT 401)

In your evidence in June, Mr. Templeton, you started by outlining the background and the creation of the Environmental Protection Board, and as I read your evidence I believe you stated the F.P.B. was created in 1970.

A That is right.

Q Now, at the time that you were created and began your work for Gas Arctic which was at that time one of the consortia studying the project, was there an ongoing environmental assessment at that time? Or were you the first environmental assessment within Gas Arctic?

A We started the first year with Alberta Gas Trunkline and then it went into Gas Arctic and the Northwest Project Group was a competing group at that time and I am not too sure when they started doing environmental work. It seemed to me it might have been a little later, but not too much later than we started and we didn't have any input on them, although we did have, after the two groups came together we did have one meeting in Winnipeg to try to compare notes and to prevent duplication, but that is the main interaction that we had.

Q Now, when you commenced your environmental work then, in 1970, were you provided with a route that had already been selected for the transportation of gas?

A There just -- and this again is what became the Gas Arctic Group, rather than the Northwest Project Group, -- they were just working

on the route at that time, the engineers for Gas Arctic.

Q And when you commenced your assessment, were you given any general corridors or general routes that you concentrated on when you were doing your studies?

A Oh, well, the company decided the route, basically, and we didn't have much input into that, if any. It was -- I think we said in probably our first Interim Report that with the state of the art that there was at that time, it was probably the only way that it could have been done under the circumstances, to start with the engineers saying where they wanted to put it and then we try to influence it. I think more could be done today than was done then, and I think we would have liked to influenced it a little more along the way, but basically the route was chosen on an engineering ground.

I think that Mr. Dau replied to that question in Whitehorse in answer to a question of mine where I was very fumblingly trying to get around on a scale of one to ten what was important in choosing the route, was it the environmental issues, the social issues, or the pipeline economics, and I think he expressed that it was about 90% pipeline economics. I am not sure that that is an accurate quotation, but it was something like that.

Q Now, as I reviewed your evidence, I understand a position of the Environmental Protection Board, ^{please} and/correct me if this is not accurate, but as I understand your position, you are of the opinion

Templeton, Adam, McTaggart-Cowan
Wilimovsky, Craik, Bliss, Gourdeau
Cross-Exam by Anthony

that the Arctic Gas project is conditionally acceptable and the condition being that it is acceptable if the recommendations in your report and your code are followed, is that still the position of the Environmental Protection Board?

A It is conditional on the project description that was provided and was included when the report was written, and it is conditional on the measures that are recommended in the report and the code and in the site specific recommendations in the atlas, yes.

Q Now, when you are talking in terms of the route and we talk in terms of the Interior Route and the Prime Route, and in that case the Prime Route is the old Prime Route, in other words, the route before the Fort Simpson and before the cross-delta amendments?

A Yes.

Q Now, if I may then, I would like to deal with the question of routing, comparing the Interior and the old Prime Route which is the prime route that you studied, and I looked through your testimony to get a clear statement of preference between the old Prime Route and the Interior Route, and I wonder if you could perhaps enlighten me by indicating what position you or other members of the Board have taken with respect to these two alternatives?

A Well, this is a very difficult question and I think that I would like to perhaps lead off and if you don't mind I would like to

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refer then to Dr. Cowan, because he has worked quite hard on trying to straighten this out. There are a number of problems in making this decision. There is the environment of Canada and the environment of Alaska, and they are both intertwined. The caribou go across the borders and many other things do. There is a wildlife range in Alaska and there is a proposal for a somewhat similar wildlife range in the Yukon, and we feel very, pretty strongly that these are very important, both of them, and should be regarded carefully.

There is the additional, probably the overriding problem of all is the possibility of finding gas west of the Mackenzie Delta. This has caused us a great deal of trouble to try to estimate, and none of us are competent to do this and we have never been able to get any clear statement of the probabilities of gas being found west of the delta, and the reason that it is so important is that if there is going to be gas found in the offshore, in the Beaufort Sea, and it is brought to land west of the Delta, there will be a gathering line brought from there to hook up to the main gas pipeline.

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The biggest problem of all is you may have a gas line along the coast anyway, and I think that's probably the over-riding consideration at all; if there wasn't that possibility or we could feel that the risk wasn't -- or that there wasn't much chance of there being gas there, I think we would tend to favor the interior route. If you're going to have a long connecting line to the interior route, you are increasing the amount of degradation. Now I think Dr. Cowan is much more better able to speak on the other aspects of the ecological picture of this than I am, could I refer it to him?

Q Certainly. Dr. Cowan?

MR. SCOTT: The transcription devices aren't working effectively, and I wonder if we might take five minutes to see if that could be set in order?

THE COMMISSIONER: All right.

(PROCEEDINGS ADJOURNED FOR FIVE MINUTES)

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. ANTHONY: Q I believe just before the break Mr. Templeton referred the question about preference between the interior and the old prime route to you, Dr. McTaggart-Cowan. I wonder if I may have your comments?

WITNESS McTAGGART-COWAN: Yes, I'll try and explain the views that I hold and why I hold them. I have been through all the reports that have come in that have been accessible to me, and I think

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1 that's all that CAGSL has produced, and I have been
4 through the transcripts in extenso, and I've tried to
3 marshall my own thinking on this, and it goes as follows:
4 As I look at the routes that have been suggested and
5 if I arrange them in descending order of preference
6 with No. 1 being the one that I would regard as the
7 most likely to cause the least environmental damage, and
8 No. 5 the -- or 4, the one that was likely to cause the
9 most environmental damage, I would put them in this
10 order: 1 would be the Fairbanks Alaska Highway route.
11 2 would be the interior route, and in this I might have
12 some -- there was a suggestion made a long time ago
13 by Dr. Calef of a modification of the interior route
14 which has never been seriously examined and just
15 a priori it seems to me to have some advantages
16 but we don't know because the facts are not avail-
17 able.

18 Q Could you perhaps identify
19 that route, since you raised it?

20 A It's a route that goes
21 further south than the present interior route. It
22 crosses the Alaska boundary a little further south.
23 It crosses the Porcupine, as my memory goes, west of
24 Old Crow, and proceeds then south of the Porcupine
25 to make junction with the Dempster Highway about the
26 place where it enters the pass. Now that's very roughly,
27 but this has been put forward by Dr. Calef. It was made
28 available to CAGSL by him on more than one occasion.

29 Next then, my No. 3 would be
30 the coastal or prime route, and my No. 4 would be the

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Yukon River route. I would think that would have very little advantage.

Now my reasons. Because I'm a biologist, I tend to place a considerable emphasis on the survival of the fauna of the area and if I address myself first to sheep. The CAGSL reports identify, as I recall, ten different groups of sheep in the Yukon area, and in the immediate adjacent Northwest Territories. The interior route contacts two of these. One of them in Canada, Mount Goodenough area of the Northern Richardsons; the second one in Alaska, the Canning River. The coastal route contacts none of the populations. The applicant maintains that the pipeline construction and maintenance will have no detectible impact on sheep. The closeness of the disturbance to the sheep ranges in the Canning River leaves me with some misgivings that this will in fact be true, but we have no objective evidence that would lead to a different conclusion. But in general, I agree that the sheep will probably adapt to the levels of disturbance that will arise from the construction and operation of the pipeline and its essential appended facilities, such as the pumping stations and the small airstrips that will service these.

But I have a major proviso, provided that the sheep are given absolute protection from hunting and harassment by aircraft, by snowmobiles, or by the direct entry of people onto their lambing ranges and their post-lambing ranges during the

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2 construction and for a sufficient time afterwards to
3 permit the sheep to have completed their adaptation,
4 their adjustment to the new levels of impact. Thereafter
5 I can see that limited hunting on a controlled basis
6 would be permissible, to be allocated on a social
7 decision basis.

8 The reason that I include within
9 that proviso the direct entry of people arises from
10 research which one of my students and I have been doing
11 on Sheep Mountain in Kluane National Park. Since the
12 park was created and has been widely advertised as the
13 easiest place to photograph and enjoy white sheep, there
14 have been so many visitors on the lambing range which is
15 closely adjacent to the highway that we are fairly
16 certain that it is the reason that the lambing of the
17 last two years has been a failure. In the years previous-
18 ly we have become used to a certain succession of lamb-
19 ing success, and since the number of visitors to the
20 lambing areas in the early spring -- this is largely in
21 May -- has increased so markedly the sheep are having
22 problems and in fact are not maintaining their numbers,
23 the population is falling.

24 Thus we have abundance of
25 evidence that sheep are adaptable. We know that from the
26 National Parks, we know it from the availability of
27 sheep quite close to some strip mines in Alaska where
28 there is a lot of noise going on, provided that they're
29 not disturbed in other ways by hunting, harassment and
30 so on.

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Now this leads me to say that

I see little to choose between the two routes on this
basis, the basis of disturbance of the sheep population.

I turn next to caribou. Based
on my own experience --

THE COMMISSIONER: Excuse me,
forgive me -- you say little to choose between the
two routes. You mean the Interior Route and the Prime
Route?

A Yes.

THE COMMISSIONER: Yes.

A From now on I will be
addressing myself to the Interior Route and the Prime
Route. I will not be talking further about the Fairbanks
Route, largely because we don't have the necessary
data on the route. My placement of it where I did is
from my own personal experience with the route, over
which I have travelled many times, and other oculauditory
evidence and the evidence of biological work that has
been done in other contexts. This is the Prime Route
before the cross-delta change that I am referring to .

THE COMMISSIONER: Yes.

A The one that E.P.B. studied.
My own experience with caribou together with disturbance
tests undertaken and reported by Calef and by the
research teams on behalf of CAGSL convinced me that the
caribou is more subject to damaging disturbance at two
periods during calving and while under attack by bot
and warble flies during the summer, than it is subject
to disturbance during the migration, either spring or
autumn, or during the winter.

Thus, based on objective
data, adduced by research done by all parties, I give

1 priority to the routes which are least likely to expose
2 the caribou herd to disturbance during these especially
3 sensitive phases, that is during the calving and the
4 time when they are under heavy attack by bot and
5 warble flies in the summer.

6 Furthermore, experience of the
7 passage of caribou across the Porcupine River, year after
8 year in the face of hunting, of the migration of caribou
9 through Old Crow village repeatedly, the movement of other
10 herds through other villages from time to time, and
11 reports in the literature, all of these convince me that
12 herds in migration are unlikely to be deterred by a
13 completed, buried, restored, cold gas pipeline, and by
14 the small number of inspection flights along the
15 operational line that have been designated as necessary
16 by the applicant, and I take that at one or two per
17 month, the low level flights for inspection.

18 I maintain concern for the
19 damage that could arise were caribou to encounter an
20 open pipeline trench, but there is no evidence to provide
21 the basis of secure judgment as to the seriousness of
22 this potential impact should this occur.
23 I do think, also, that it could be mitigated.

24 This analysis of evidence leads
25 me to conclude that, 1) the completed pipeline along the
26 Interior Route is unlikely to deter caribou from their
27 migratory movements. I emphasize the completed one; and
28 2) that the Prime Route will expose the caribou to the
29 potential for disturbance during its most sensitive
30 periods, that could lead to increased calf losses and these

1 are already high.

2 Let me turn next to grizzlies,
3 and I am only going to address myself to the species which
4 I think have some significance for the decision that you
5 are trying to reach.

6 These bears occur in the area
7 adjacent to both the Prime and the Interior Routes. An
8 average density supplied by Dr. Pearson who did many
9 years of research on the grizzlies of the Yukon was
10 stated by us in our report as one per twenty square
11 miles, slightly lower on the coast than in the Interior.

12 My second point: the Prime
13 Route, that is the Coastal Route, extends a 135 miles
14 through grizzly habitat; the Interior Route through
15 88 miles of grizzly habitat.

16 Three, the evidence I derive
17 from Volume 32 of CAGSL is that the Canning River
18 portion of the Interior Route, this was evidence put
19 in from Alaska, intersects the ranges of at least six
20 grizzlies. In my judgment, both routes will involve
21 interaction with grizzlies, and that these interactions
22 will have about twice as much impact on males as on
23 females, because of the home range of males is about twice
24 the size of that of females, more of them are apt to con-
25 tact the pipeline. But I see no substantial difference
26 between the impacts of the two routes on grizzlies.

27 Next, furbearers. I see no
28 differences between the two routes, so the species involved
29 will be different. The level of interference that the
30 pipeline is apt to have with most of the furbearing mammals,

1 I agree with the analysis that it is likely to be
2 minor.

3
4 Turning to birds. Dr. Gunn and
5 his group have established the details of bird populations
6 and have, in my view given an excellent statement of
7 the potential impacts. I concur in his judgment. The
8 only additional mention that I will make is that there
9 are two rare species of shore birds that are known to
10 nest only in Arctic Canada, and perhaps in the adjacent
11 north coast of Alaska. Now, these have exotic names.
12 One is known as the Hudsonian godwit, and it has been
13 put in evidence before you. The other is the buff-breasted
14 sandpiper. Both of these are rare birds. Both nest in
15 small areas. We don't know what the basis of selection
16 of these areas is. Both of them are on the Prime Route,
17 if you include particularly the trans-delta section. I
18 don't think that the Hudsonian godwit has been shown to
19 nest on the Yukon coast west of the Delta, but it does
20 nest in the Delta.

21 This, to me, gives some favour
22 to the Interior Route.

23 Item six, for fisheries, I
24 understand that Dr. Wilimovsky favours the Prime Route. I
25 accept his judgment.

26 Seven, turning to terrain. The
27 terrain traversed by the Interior Route is a small part of
28 a very large biome, whereas the coastal aquatic and the
29 onshore habitat of the coastal route is a relatively
30 unique biome in mainland Canada. It has no alternatives
31 to the large and diversified fauna of marine birds, or

1 shore birds that are completely dependent upon this route
2 --or this habitat. It follows that any major disturbance
3 of this environment, which results from stockpiling, stag-
4 ing, construction, or oil spills, would be far more
5 damaging than the alternative conditions on the Interior
6 Route.

Turning next to wilderness

8 range. The Interior Route renders it unnecessary to
9 cross the Alaska-Arctic Wildlife Range, or the area
10 proposed by the adjacent Canadian Arctic Wildlife Range.
11 This to me favours the Interior Route.

Carson Templeton mentioned the possibility of future discoveries and this is something that has given all of us considerable concern. It seems to me that we can state it this way at this point in time, that there may be petroleum discoveries east of Prudhoe Bay in Alaska, that is, on the Canada side of the existing field, and west of the Mackenzie Delta, so that the discoveries will be approaching each other from two directions, and of course in the adjacent Beaufort Sea of Canada off the Mackenzie Delta.

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1 It seems to me to be a good
2 gamble that these discoveries will not come into contact
3 with each other and indicate a continuous field,
4 therefore leaving an unspoiled area between the discover-
5 ies made coming eastward from Alaska and westward from
6 the Mackenzie, and that the discoveries that are made
7 east of Prudhoe and west of -- the discoveries made
8 east of Prudhoe would be piped into Prudhoe. The
9 discoveries made west of Mackenzie would be piped into
10 Mackenzie. Now they will certainly come ashore as quickly
11 as they can for technical reasons that I'm sure are
12 well-known to everybody.

13 But I am prepared to gamble
14 that there will be left an area which will not have to
15 be traversed by a pipeline, which will probably be c arry-
16 ing oil -- there will probably be two, oil and gas,
17 between those two areas of discovery, whereas if there
18 was a pipeline already along the North Coast, the frame
19 of reference would have been changed. There would be
20 no incentive to run pipelines with the least possible
21 damage either east or west to bring these discoveries
22 to market. Indeed, there would be incentive to improve
23 the communications along the whole North Coast, I would
24 see it leading to a road and we would then have a gas
25 pipeline, an oil pipeline, and a road, and we could kiss
26 the area goodbye.

27 Mr. Weedon, in his testimony
28 to you, sir, called attention to the potential to
29 petroleum discoveries in the Marsh Fork area of the
30 Canning River. We have also been told that there is

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potential for discoveries in Eagle Plains of Yukon Territory. Both of these are associated with the interior route.

My analysis of this situation suggests to me a preference for the interior route.

Item 10 in my considerations has been the oil pipeline route, be there oil discoveries made along the North Coast, or whether there is additional discoveries made in Alaska which suggest that they should build one into the delta, to tap into the Mackenzie Valley Pipeline, assuming it is built. I think it is our collective view, the Environmental Protection Board --

THE COMMISSIONER: Sorry, Dr.
McTaggart-Cowan.

A Yes.

Q Would you just go back to the beginning of this latest train of thought?

A Yes.

Q I missed something .

A I am assuming that there may be oil discoveries of such magnitude in Alaska that even with the Trans-Alaska Pipeline they will want to come across somewhere to feed the oil more directly into the pipeline net which leads to the American Midwest.

Q Yes, you're postulating
a second oil pipeline along the original Mackenzie
Valley route that was talked of five years ago?

A Yes, and one leading from

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Alaska to tap into it.

Q Well, to bring Prudhoe Bay oil across either the North Slope or the interior route --

A Yes.

Q -- and up the valley.

A That's right, or perhaps new discoveries west of the delta. I think our collective view is that there should not be an oil pipeline built along either the coastal route or the interior route unless technology is so changed that it can be done in ways that are quite different from those that are available today. Our collective view would be that an oil pipeline on either route would be unacceptable. However, again -- I'm now returning to my personal preference -- if I had to make a choice it would be the interior route largely because the potential for spills in my view could be more quickly handled in the interior route than on the coastal route before it got into a position to do massive damage to the rather rare and concentrated waterfowl that use the coastal route.

Now I know that there are other gambles here that if we do have major oil discoveries, which I'm sure many people hope for in the Beaufort Sea, because we're all in this conundrum, a continent that needs energy, that there will be then the potential for oil spills on the sea already and this could impact upon the Yukon coast.

I find another influence that

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2 concerns me though I haven't checked the details. My
3 personal experience with the coast, which is relatively
4 minimal, is that it is more subject to fogs and low
5 cloud cover than the interior route would be, and that
6 this would be more likely to require flight of aircraft
7 below elevations which we have established as disturbing
8 to wildlife. It may be a minor point.

9 I turn then to some comments
10 that have been made during the course of the hearing on
11 the Dempster Highway and the probable impact of the
12 additional use of the Dempster Highway during any con-
13 struction of an interior pipeline -- interior route
14 pipeline, as opposed to a coastal route. I had assumed
15 this as, this route as being used primarily for the servic-
16 ing of the interior route, were that route chosen. But
17 I found in evidence a statement that it was a very
18 attractive route for the transport of pipe and other
19 supplies no matter which route is to be used, whether
20 the prime route or the interior route was to be used.
21 It can be -- pipe can be freighted to Skagway, it can
22 come up the White Pass & Yukon to Whitehorse, and then
23 there's a highway which could be used to take it all-
24 weather through to the delta area, or wherever the trans-
25 shipment wants to be. This I think was put in evidence
26 by O'Rourke at the Whitehorse hearings, and it was
27 questioned and verified.

28 True, if there are laterals
29 build, and there are four laterals referred to, one to
30 Old Crow, one to LaPierre House, one to a mile which I

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2 don't recall, another to Mile 4 something or other which
3 I believe was going the other way from the Dempster.
4 The ones that were going north would have an impact and
5 would tend to be contrary to my general judgment that
6 the interior route is preferable. But when I put all
7 these together I am led by the examinations of what evi-
8 dence all the research teams have put in and from the
9 judgments that I've made to conclude that the lesser of
10 two evils -- and I would put it that way -- the lesser
11 of two evils would be the interior route.

12 Furthermore, on a bit of
13 superficial information, I would like to see some
14 serious consideration of the alternate of the interior
15 route that was suggested a long time ago by Dr. Calef.

16 That answers your question,
17 I think, quite thoroughly, I hope.

18 THE COMMISSIONER: Before you
19 go on, could I just ask one thing? Dr. Wilimovsky
20 expressed a preference back in June, and since then
21 Dr. McCart, Mr. Walker and Mr. Steigenberger, the
22 latter two being with the ^{federal} government, have expressed
23 preferences and I thought you preferred the interior
24 route, Dr. Wilimovsky but --

25 WITNESS WILIMOVSKY: I stated
26 in original testimony and gave the reasons whereby why
27 I preferred the coastal route, and my judgment
28 based on the aquatic environment remains the same, sir.
29 There is a great difference in making assessments on
30 these wet things as opposed to those above ground, and

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2 if I may add additionally to Dr. Cowan's remarks, if
3 I were sure that there were never to be an oil line
4 associated with the gas line route, I could stick with
5 that statement and justify it I believe on the grounds
6 of all aquatic biology. That one unknown factor disturbs
7 me and when Dr. Cowan just now indicated that we're
8 in agreement that a line shouldn't be built, an oil
9 line shouldn't be built down the valley, I wish to
10 emphasize a little more caution. We haven't studied
11 this and at least from my point of view, my adherence
12 to Dr. Cowan's remarks is based on work on other pipe-
13 lines in other places. It's only fair to say from the
14 aquatic side we haven't looked at an oil line. This is
15 extrapolated information from other areas, but I do
16 prefer the coastal route.

17 WITNESS McTAGGART-COWAN: My
18 comments on the oil line, sir, were based on the same
19 sort of information. It would have to be carefully
20 studied on a site specific basis.

21 THE COMMISSIONER: As I recall,
22 Dr. McCart said that he preferred the prime route because
23 he was concerned about protecting the char fishery in
24 the Canning River Valley. I think Mr. Walker said that
25 he preferred the interior route to build a pipeline
26 over the interior route because of the greater number
27 of species and races of sub-populations meant that the
28 chances of recovery following construction were greater
29 there; and Mr. Steigenberger, who was with the Federal
30 Government, as I recall he said he preferred to build

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2 it along the prime route because there were less fish
3 to interfere with there than on the interior route.
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1 I think that I have got
2 all those gentlemen right.

3 WITNESS WILIMOVSKY: Yes, sir,
4 you do.

5 THE COMMISSIONER: Right, well,
6 carry on, Mr. Anthony.

7 MR. ANTHONY: I wanted also to
8 have the panel take up an invitation extended to you by
9 the Commissioner when you appeared in June, and that is
10 to discuss this question of cumulative impact, and I was
11 going to deal with that later, but we seemed to have
12 touched on it now as we get into the question of an
13 oil pipeline and I am wondering if you, Mr. Templeton,
14 perhaps can start and if any of the other panel wished to
15 build on what has been said, or comment further, I would
16 like to get your assessment of the various alternatives
17 and also an indication of what cumulative impact and the
18 impact these other developments, such as the oil line, and
19 perhaps a road, and we've started along this road and
20 there were some comments in June by Dr. McTaggart-Cowan,
21 in particular on that, but you were invited to consider
22 the matter and respond further and I would like to hear
23 your comments if you have anything further to add on this
24 question on cumulative impact as it relates to route
25 selection.

26 WITNESS TEMPLETON: I think that I
27 promised the Commissioner at that time that we would
28 study it and we have not been able to do so, and any
29 remarks we would have have been based on rather -- just
30 observations from having heard, read the testimony and any

other information we have. I would think that next week you are going to hear a great deal about the cumulative impact on the Mackenzie Delta and this must of necessity cause us all a great deal of concern because it's a very sensitive area and a very important area since it's the only major delta in the Canadian Arctic.

The spending of all of the money for the gas plants and gathering systems and the drilling of the wells automatically produces an accumulation of the results by the introduction of people, and the machines that they bring with them. I think that Dr. Cowan mentioned his worry about the gas line, regardless of whether it goes on the coastal route or the interior route, because it does sort of put the foot in the door for an oil pipeline and a road and this Board has always been adamantly opposed to either across the northern Yukon. We don't feel -- in fact, I think that we would like to urge you as one of your terms and conditions, Mr. Commissioner, that you not -- that you say there should not be these other activities, but we realize that as the need for energy grows that there is going to be more pressure and perhaps nobody is going to listen at that time.

I think whatever is done, there is going to be an accumulation and I think the advent, or the announcement of the road, the Mackenzie Highway, did set the corridor and did set the start of the other activities to do with energy. I suppose people could argue that when the communities were all set on the east side of the Mackenzie River, that that started the

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corridor, I don't know. The only thing is that hopefully we've progressed so that we are not blindly following everything that once something starts that we automatically have to accept that everything else is going to automatically follow. I don't think that I have anything further to add, Mr. Anthony.

Q I think that Dr. Bliss had his hand up. Would you like to comment further?

WITNESS BLISS: Mr. Commissioner, might I add a point or two along this sort of collective set of thoughts of route comparison as well as cumulative impacts.

Dr. Stan Thomson, one of our Board colleagues, and I have tried to put together a few of these items. It is only a first go at it, so it is tentative, but we have tried to pick those kinds of things where we felt that there would be an impact, both biological as well as a terrain-geotechnical. We have come up with twenty-seven.

We then tried to quantify this a bit in terms of a number sequence from one to five, with the one being a very low impact, probably no significant biological change to whatever we were talking about, or terrain change, in the general range of about 1% to 5%; an impact of three, being a significant, or moderately significant biological change in the general range of 5% to 20%; and five, a very significant biological-geotechnical impact in the range of 20% to 50%, and again, I qualify this on the basis that this is a first go at it, and no attempt to in final analysis have this stand without

modification.

Taking into consideration then such things, we don't need to go into all the detail we should right now. The people in communities, the present road system, not adding roads, not adding any other impacts of pipelines, the taking into consideration then components of vegetation, of wildlife, of wilderness, recreation, and geotechnical aspects.

Putting down number values, then, from one to five for all of these twenty-seven components in the Interior versus the Coastal Route, the numerical values come out slightly in favour of the Interior Route on a total cumulative impact, and again I caution that one can get hung up with a number value and hold this up as the most important phenomenon, it isn't -- but at least it is an attempt, first of all for me and for Stan, I think, to try and come to grips with this important aspect and in turn in doing this to recognize that not all of these components have equal values specifically. The potentiality for weedy species, I would never consider this having a potential of a five --

THE COMMISSIONER: I am sorry, the potential for what?

A For weedy plant species would never have a potential environmental impact of a five, a very significant modification, but the potential impact of people in communities, or the impact modification of the caribou population in terms of its calving ground or its winter range, or bear, of other things, could have an impact of five. So that there

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is at least some component within this of recognizing
that they are not all equal.

MR. ANTHONY: Mr. Templeton, I
don't know if any other people wish to comment on --

WITNESS BLISS: I am sorry, may
I correct that? The numbers are higher for the Interior
Route. They are lower for the coastal. We favour, on
the basis of this, we favour the coastal route, pardon
me. So it is the exact reverse.

MR. ANTHONY: One more swing
at it, okay.

Q Mr. Templeton, so that I
understand the opinion of the Board, though, you made
the statement when you gave evidence at page 6447, you
say that the Environmental Protection Board does not
accept a corridor concept across the northern Yukon, and
you discussed in the answer to my question the problems
of the considerations involving an oil pipeline and a
road and the fear that has been expressed before this
Inquiry that these will inevitably follow the location
of a gas pipeline.

Now, if in fact this is your
view, in other words, you agree with the view, in other
words that these will follow, is it then the view of the
Board totally and in unanimous agreement, that you would
not approve of either the Interior Route or the Coastal
Route?

WITNESS TEMPLETON: We don't
-- we would prefer to see neither route built, of course,
but the Government of Canada has said that it is their

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policy to take the oil out of the delta and I think they
have also said that they are encouraging the building
of a pipeline to take Alaska oil through Canada, I suppose,
for economic reasons, and we're practical, I think -- we
must look at it in a practical way of what is liable to
happen in a democratic society.

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1
2 Perhaps any other
3 kind of society too.

4 Q As an environmental
5 panel then, it has examined alternatives. Your position
6 remains as you have expressed it at that time, that
7 given a corridor involving a gas pipeline, an oil pipe-
8 line, and possibly a road, that you would be opposed
9 to have such a corridor on either of the -- anywhere
10 across the North Slope of the Yukon.

11 A Yes.

12 Q You --

13 THE COMMISSIONER: Well, they'd
14 be opposed to it along the interior route too.

MR. ANTHONY:

15 Yes, that's correct. I
16 think that's the opinion of the Board, is it?

17 A Yes.

18 Q You stated in answer to
19 an earlier question that your comments about the prime
20 route versus the interior route did not include a
21 consideration of the new prime route with two changes,
22 the cross-delta change and Fort Simpson route change.
23 Now since last you appeared before us Arctic Gas has
24 prepared and filed an environmental impact statement on
25 the Fort Simpson route amendment. Now have you had an
26 opportunity to examine that environmental impact assess-
27 ment?

28 A Yes.

29 Q Have you also had an
30 opportunity to examine and review the evidence before

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1
2 this Inquiry on the Fort Simpson route change?

3 A Yes.

4 Q Mr. Templeton, in your
5 opinion, is this environmental impact study adequate?

6 A No, it isn't.

7 Q And if not, why is it not
8 adequate?

9 A Well, I think it would
10 appear -- and once again we have not been able to study
11 this, so our judgment is entirely on what we have seen
12 in evidence. I think Dr. -- Mr. Zoltai brought out some
13 problems of terrain, the matter of natural and the
14 matter of palsas, whether they're a natural form or
15 came about because of the chilled pipeline. The matter
16 of the steep slope on the south side of the Ebbutt
17 Hills can cause some fairly serious erosion problems.
18 I don't doubt, I think that it could be built, but if
19 you're going to look at it from an environmental point
20 of view you're looking at an alternative that can
21 cause less environmental damage, and it would -- I
22 couldn't help but think that having read Mr. Zoltai's
23 appraisal that he -- that it was worth looking at. I
24 don't say I would necessarily having seen it studied,
25 would necessarily agree with that but from the evidence
26 it didn't appear to be that much longer; but the steep
27 slopes are always a problem. We don't see any reason
28 why the line should be chilled that far south and the
29 problems in this area can be fairly serious from a
30 terrain point of view.

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1
2 Q You also examined the
3 environmental impact statement prepared by Arctic Gas
4 for the cross-delta route changes.

5 A Yes.

6 THE COMMISSIONER: Excuse me.
7 Before you leave the Ebbutt Hills, do you favor then the
8 Foothills route around the Ebbutt Hills?

9 A I'm not sure that I -- I
10 don't think that either of them are adequate to make
11 the appraisal. I think that they need some more study. I
12 think they're extrapolating the information from across
13 the river to too large a degree, and that it needs --
14 there may be other things that I haven't even thought of
15 and I think it needs much more detailed appraisal before
16 you make up your mind as to which is the right route.

17 MR. ANTHONY: You stated that
18 you have examined the Arctic Gas environmental impact
19 statement covering the cross-delta route. In your
20 opinion, is that environmental statement adequate?

21 A No.

22 Q And why not?

23 A Well, once again I'd like
24 to repeat that the delta is a pretty unique area and
25 must be treated with a great deal of respect and a great
26 deal of study, and I think that anybody who wants to change
27 any delta should make -- should be able to demonstrate
28 very conclusively that he has covered everything. You
29 know, you can't extrapolate from your information going
30 around the delta, and I realize that they haven't done

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1
2 this in all cases, but there is the beluga whales and
3 certainly they're going to be working in the summertime
4 across Shallow Bay . There's problems of the inter-
5 action between a cold pipeline and the environment
6 through an area where the permafrost is very irregular
7 due to the movement of the channels and the lakes in the
8 delta, and it can be expected that it can be very
9 difficult to predict where the permafrost is,
10 it's impossible; and I wasn't satisfied that the
11 putting the chilled pipeline across there had been --
12 all of the problems had been brought out. I was not
13 entirely satisfied with the analysis of what people
14 were going to do in the area and how they were going to
15 be controlled, and I felt that it needed a more intensive
16 study than I saw.

17 MR. MARSHALL: Mr. Anthony,
18 perhaps you can ask the witness just to identify which
19 assessment he was looking at. There were a number of
20 reports that we distributed just before Christmas.

21 MR. ANTHONY:
22 Q Yes, there is an environ-
23 mental impact assessment, formal document, and a number
24 of supporting reports in addition. Have you had an
25 opportunity to examine them?

26 A The one I'm referring to
27 is Arctic Gas environmental assessment of the cross-
28 delta route dated December 19, 1975.

29 Q Fine, thank you.

30 A But are there other
volumes than that?

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1

2

MR. ANTHONY: Mr. Marshall

3

may want to pursue these questions with you when he

4

has an opportunity to ask them.

5

Q Mr. Templeton, is the

6

Environmental Protection Board now doing an environmen-

7

tal assessment of these route changes as it did on the

8

original route?

9

A No.

10

Q Could the Environmental

11

Protection Board then give its conditional approval

12

to this new prime route, as it did to the original?

13

A No.

14

Q Are you able to indicate

15

in any more specifics the sort of work that should and

16

needs to be done in terms of recommendations to this

17

Inquiry before such approval? Or are your comments

18

made in the general terms as far as you would go?

19

A I don't believe that I

20

could make sort of an outline of what research was needed

21

at this time. I think it would take, to do a -- to plan

22

a research project takes some time and to think out and

23

do. We have not been able to do this.

24

Q Mr. Hemstock, when he

25

appeared before the Inquiry, stated that he did not

26

think it was necessary to conduct an environmental

27

impact assessment of the new prime route. Do you agree

28

with him on that?

29

A Of the new prime route.

30

Now this was a -- is this the whole route including

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Cross-Exam by Anthony

1
2 the cross-delta and the Simpson relocation?

3 Q Let me give you the
4 citation. I don't have the volume number because I just
5 have a photo copy of it. It's page 14772 and in answer
6 to a question by counsellor Templeton he was asked whether
7 or not he felt an impact assessment of the new prime
8 route was required, and he said, "No." I'd ask you
9 whether you would agree with that or whether you feel
10 such assessment is required?

11 A You should ask that
12 counsellor.

13 Q I have now.

14 A Well, I think the problem
15 of assessing in pieces is a difficult one and one that
16 you don't like to see because if you break it down into
17 small enough pieces you can say, "Well, that is insig-
18 nificant," but when you start adding them all up, the
19 total becomes very significant and I think Dr. McTaggart-
20 Cowan used a phrase when we were here in June about
21 the destruction by insignificant increments or something.
22 So that you need to -- I don't say you throw everything
23 out because you've made two route changes, but these
24 are very major route changes. This is half of the line.
25 It isn't just the cross-delta route, it goes down on the
26 east side of Travaillant Lake, so this is a pretty major
27 thing and I think the whole thing needs to have -- be
28 summed up and the total impact assessed.

29 THE COMMISSIONER: Well, it's
30 a new pipeline, that's what you're saying.

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Cross-Exam by Anthony

1
2 A To a very large degree,
3 half of it is new, and including the Mackenzie Delta
4 which is pretty significant.

5 MR. ANTHONY: Q Now, considera-
6 tion of routes and the cumulative impacts and so on we
7 have discussed ultimately leads to a discussion of
8 pipeline authorities, and you dealt at some length in
9 your evidence on this question of authority and the
10 role of government. But I didn't understand fully the
11 position that the Board was taking as to the responsi-
12 bility that you see the government having to undertake
13 in addition to those responsibilities that you indicated
14 the applicant must take in ensuring environmental protec-
15 tion. I don't want necessarily for you to review the
16 evidence given, but I still don't understand exactly
17 the role of government as you see it in enforcing
18 environmental protection.

19
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A Well, the way that we see the whole matter of government versus permittee or applicant, whatever the word you use, is one that -- each of them have a responsibility to do certain things, and this isn't at all unusual. It is the same in the construction industry, ^{the owner} as is usual has engineers, supervisors and so on, and the contractor has his forces and they interact in certain very specific, definite ways. There is a construction job and that is the usual way in the construction industry.

Now that we are adding other dimensions to that in the way of social and environmental considerations, the government responsibility, as well as the applicant, becomes much more important and there is a great deal more skill required to recognize that not only should the structure be adequate and economic, it must also take into account social and environmental considerations and so we tried to -- we recommended in our code, the type of government structure that we felt was the practical way to ensure that the pipeline company, its contractor, sub-contractors, suppliers and the people who were going to be working for it, would recognize the environmental considerations and that we wanted to put some teeth in it by making sure that the whole structure of the permittee, the pipeline company, was going to live up to those.

I am not sure that I have answered your question --

Q Perhaps I -- I think you have as far as the basic philosophy and principles involved,

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and perhaps I can turn to Mr. Craik then and be more specific.

You commented in your evidence that besides the code that there should be an independent pipeline authority, and do I understand your position and the position of the Board that until such an independent authority is established, that a pipeline should not be approved, agreed to?

WITNESS CRAIK: Yes, Mr. Commissioner, in reviewing the evidence from June, I think it probably would help to attempt to clarify what was said at that time as well. Our main recommendation was that a single authority be created that could bring together all the powers that exist in the different acts and legislation and in the different government departments so that you could have one single agency that would administer this during the period of the pipeline construction and probably more importantly the lead up period to the construction in advance of the construction, because I think probably there would be a very strong tendency to underrate the amount of planning that is required to bring into effect good environmental control during the construction phase.

But our recommendation was that primarily to make sure that this large project is adequately planned for from an environmental point of view and controlled from an environmental point of view, and I think that we also feel that it is in the best interests of the construction procedures as well that this happen, that it be done by this one group, responsible

1 still to the federal government, but probably taking
2 its authority in terms of traditional responsibility
3 from most of the federal government departments that have
4 a vested interest, I guess you'd call it, in the
5 construction of the pipeline, and at the end of
6 the project be in a position to disband unless there is
7 some other similar project of a similar size underway at
8 that time.

9 I don't know if that adds --
10 but I think that maybe there is one more point there that
11 was left unclear in the testimony before, that is, how
12 it would report or to whom is it responsible, and our
13 feeling was that it wasn't critical which ministry it
14 reported through, but it should report through one of
15 the ministers and have power during that period that
16 are probably comparable to the powers of the National
17 Energy Board, and if it were the Minister of Energy,
18 we have no objection to it being the Minister of Energy,
19 we are not trying to build up one department, necessarily,
20 but we feel that it should report through a minister and
21 have the same sort of powers and flexibility that a
22 National Energy Board would have, or that probably the
23 same sort of powers and flexibilities that the govern-
24 ment's prepared to grant to a Crown corporation, although
25 we wouldn't call it a Crown corporation. We are just
26 trying to say that it has to have a high degree of
27 flexibility, have clear cut terms of reference and be able
28 to operate without any overly great amount of bureaucratic
29 problems.

30 Q You have indicated that this

1 authority should become active in the planning stage of
the project and then carry on to the end of the project.
Are you considering the end of the project being the
4 end of the construction, or the economic life of the
5 pipeline?

6 A No, I think just till the
7 end of the construction. If you are looking at the
8 end of the pipeline, you are looking too far down the
9 line. I think in that stage of the game the monitoring
10 that you might want to do, post-construction monitoring
11 and watching, should revert back to the normal territorial
12 or federal government departments. It is just the
13 degree of intensity that is the problem. A three year
14 project with that investment of equipment and people
15 all at once is just a very large thing to control .

16 Q And such an authority
17 would operate also then during any subsequent looping
18 if that should take place and also any subsequent
19 construction of an oil line or road or any other such
20 major facility in the same corridor?

21 A I don't think we have really
22 discussed that at any great length, but I think that it
23 would be safe to say that it probably wouldn't be required
24 unless you had the scale of that next subsequent operation
25 was comparable to the scale of the first.

26 I think again that the structure
27 that we are looking at, the government structure, this
28 special agency, doesn't have a size that is of a same
29 scale as that that would be required by the builder of
30 the pipeline, because we are really looking here from the

government point of view at an inspection type of role and a control type of role, whereas, on the contractor side you are looking at not only inspection, their own inspection of their own facilities, but you are looking at training programs and training facilities and other things that require a much larger type of operation than what the government would require.

So, perhaps to answer directly, unless the scale of the subsequent projects were near the scale of the first, which is the major pipeline building, I would think that control of those, you are going to have a much higher degree of experience built up by that time and I think you should probably cross that bridge when the time comes. The problem is right now that we haven't built projects where you had the degree of environmental input up to this stage, nor the planning of environmental controls that goes in during the construction.

Q Following that on further into the question then of enforcement, and perhaps this is more directed to you, Mr. Templeton. On page 6285 which is volume 47 of this Inquiry, you made the following statement, and it is brief so I will just read it to you. You stated:

"The Applicant has demonstrated through his exhibits and through his consultants at this Inquiry a great awareness of the technical problems that must be overcome to construct and operate a gas pipeline through the Yukon and Northwest Territories. It has not, however,

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transferred this awareness into environmental
specifications for the project."

And then later on at page 6291 you also make this
statement at the bottom of that page:

"The Applicant has presented a considerable
amount of detail as to how it will manage its
operations to ensure the continued integrity of
the pipeline. This same degree of detail is
needed as how it will manage the operations
under its control to ensure the integrity of the
environment."

Now, you seem to be stating in those quotes that I have
given you, a concern about not only identifying the
problems, but in some way synthesizing them into
recommendations. Now, first of all, is that what you
are getting at? Is that a shortcoming of the Arctic
Gas work as you see it?

1 WITNESS TEMPLETON: Yes, I
2 think so.

3 Q And these comments that you
4 made in June, now that you have read the subsequent
5 evidence, do you still feel that this synthesis and this
6 bringing together is something that should take place?

7 A I am having a little
8 difficulty with the word "synthesis", but I think that
9 if what you mean is that this needs to be put into some
10 kind of a form that a contractor or a resident engineer
11 or somebody can understand, yes, I think that there is
12 more needed in that way and that I probably should say
13 that I have a somewhat philosophical difference with
14 pipeline companies in general in this because basically
15 the pipeline industry has a very highly optimized method
16 of construction. There are very few like that and
17 they build it in the field by the methods that they
18 know how to do and this, so it makes for cheap pipelines,
19 but it makes difficulties for things because you can't --
20 for a regulatory body, because they don't know what they
21 are going to build, and the Pipeline Act allows you
22 to go and build a pipeline most anywhere and then
23 you survey the right-of-way later and you've got to
24 pay for the land that it goes on. But this, when you
25 put the environment dimension, or the social dimension
26 into this, the whole system that the pipeline industry
27 uses, makes it pretty difficult, because you can't
28 get these plans ahead of time, and other things, like,
29 say, a design of a bridge, you design it completely
30 before you go to build it, and it then is fairly easily

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controlled, whereas the pipeliners as an industry don't do that, and so the whole matter of environmental specifications, I would like to see done. I think we said also that we didn't feel that the degree of environmental controls was as adequately handled by the applicant for environmental things as it was for engineering things.

Q And in your view is this an obligation of the applicant before seeking approval?

A Before giving approval, yes.

Q I would like to now turn to a few specific issues that have come up dealing with particular environmental problems since last you appeared and to get your comments and the comments of your Board on them. In answer to a question by Mr. Ryder on page 14091 Mr. Hemstock indicated that they expected to have a total of 27 environmental inspectors as part of their enforcement team in the field. I am wondering if you -- and they described their details at other times and at other parts in the evidence. Now, is such a proposal in your view an acceptable way of enforcing the types of recommendations that you have made to this Inquiry?

A Well, I read that quite carefully and I don't have it with me, but -- because I am not too sure what Mr. Hemstock was meaning, and I don't like to say because he has done a lot of work with Imperial Oil that has been -- obviously he knows a great deal about how to control an operation, but

1 if I could answer it by saying what I think is needed and
2 what we recommended was that the agency have a group, but
3 the applicant -- the environmental matters would be
4 controlled through the manager of the spread that was
5 doing the work and the way we ensured that he was going
6 to be part of the environmental team was that there was
7 going to be a bond that he was going to have to account
8 to his management for if there was a claim made against
9 him, and so, it is hard to say all we are going to do is
10 have so many inspectors, whether they are 27 or anything,
11 it is a whole hierarchy of people in the field from the
12 manager down in the field to biologists and archaeologists.
13 It also includes back up people in the head office or
14 somewhere where the inspectors or people in the field
15 can refer to problems: biologists, fish biologists and
16 other archaeologists and various ecologists^{and engineers} to do with
17 terrain and everything else. So, it is a whole hierarchy
18 stemming from the head office of the company right to the
19 field. So, I think that Mr. Hemstock probably knows that
20 and so that when he said a number of inspectors I am not
21 sure that he was disputing that, but perhaps you can
22 ask him, -- I don't know.

23 Q Another issue that you
24 addressed in your evidence was the question of a
25 manual, a field manual, or something that people in the
26 field could use and refer to. In the evidence called
27 by Foothills, Mr. Bouckhout on behalf of Foothills, on
28 page 15113 talked in terms of a manual and he indicated
29 in that though that the manual would include not only
30 designated protection measures, but also optional

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measures and procedures for application to unanticipated events.

Now, I gathered from your evidence that you had no provision for optional procedures. Now, is the manual that Foothills is suggesting as the appropriate one the same sort of manual on operation that you have recommended?

A I think that we had really anticipated a number of aids and manuals, some of them were to do with the training program and they were spelled out in that training program to -- well, I shouldn't say -- it wasn't the training program, it was an outline of what we felt, how we felt a training program should be oriented. I think we were -- there is a whole lot of manuals needed to train the workers and the management and the detailed specifications needed to be worked out, and perhaps this is the manual he was talking about, needed to be worked out together with the regulatory agency, so that the management of the pipeline company knew what was required by the agency's forces so that the agency's people need to be trained as well, because there just simply aren't enough environmental inspectors in Canada to do this, so they have got to be trained. So, hopefully, both the agency and the pipeline companies would get together on the type of things that were necessary as far as acceptability and how the whole matter was going to be handled, because it is very difficult when it is fifty below to worry about -- or stand out arguing about some detail of what is going to happen in the summer.

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Q Well, I can appreciate that, and perhaps then we can pursue that point one bit further, and perhaps with you, Dr. Wilimovsky. You, in your evidence, you talked about safe siltation levels and I want to latch on to that as an example of the sort of problem that I am concerned with and I discussed the question of enforcement with Dr. McCart which is found at page 13814 to 13821 and if I can summarize, I hope that I am being fair to him, he seemed to be indicating there that the method of protecting the environment, and he is speaking of the aquatic environment here, was through competent biologists on site during construction and he didn't seem to be very much in favour of the concept of standards for a siltation level or whatever.

What, in your opinion, and first of all, have you read -- did you read Dr. McCart's evidence on this question of enforcement of aquatic protection measures?

WITNESS WILIMOVSKY: I scanned it, sir.

Q Now, what, in your opinion are the best techniques to employ environmental protection, dealing with the whole question of enforcement and use of standards?

A Dr. McCart is a trained and a highly competent professional. Just as in your field, professionals do things in different ways. In my personal opinion and in view of the cost of environmental impact surveys and assessments, I think that

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the only way to go in the long term is to establish a set of environmental standards, not just for this project but for all, and I think in concept Dr. McCart is saying that a person that has his qualifications out on the ground, could monitor and make necessary corrections and I don't in any way disagree with Dr. McCart, but I am saying that not all people may be as well trained as he is or have the breadth of experience that that gentleman has, and therefore, I would like to see a set of standards established so that, of the type that were alluded to by Mr. Doran in Volume IV of our report that was tabled in June. We are a long way from going toward a group of standards that are acceptable by all for all environments for all situations, but I think that it is imperative that the biological community, the environmentalists as a group, establish such standards so that people can work to these and there is a basis for comparison, so that a person with limited technical training, even a group of competent engineers with no biological training, but able to read instruments with the training that they have, could go out and make these measurements. So, in brief, in answer to your question, I think that it is mandatory that the biological community strive towards the standards of environment.

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1
2 Q Then having quantified
3 and developed these standards, are these the sorts of
4 things that would then be documented in a manual or
5 whatever format is appropriate that you've been discuss-
6 ing, Mr. Templeton?

7 WITNESS TEMPLETON: Yes.

8 Q Again, Dr. Wilimovsky,
9 while I have you, the evidence before us with respect
10 to methanol testing has been -- we've discussed this
11 matter at some length and it's of some concern because
12 of course it's one of the few contaminants that the
13 applicant has admitted will be discharged into the
14 environment. Have you had an opportunity of considering
15 the impact of methanol or the method of methanol disposal
16 and do you have any opinion?

17 WITNESS WILIMOVSKY: The
18 reports that have been available to me are those that
19 have been prepared by CAGSL as well as a very few things
20 in the toxiological[/] and solution literature. As you indicate, it is
21 the only effluent proposed to be introduced into the
22 [/] biological system by the applicant and on that basis I personally
23 would like to see more of the characteristics, more of
24 the range of tolerances of different organisms, not
25 just fish. I think another important factor is more
26 information as to how the residue, as I understand it,
27 is to be dispersed in the system, and what time of year
28 and under what circumstances. I realize that you're
29 going to try and recover-- the companies are going to
30 try and recover most of the methanol; but the small

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1
2 residue, if it's dumped out on the snow and^{ice} over a
3 river or in the watershed itself, these are questions
4 that have not been detailed and indeed under operational
5 requirements may require a variety of answers and since
6 it is the only piece of garbage, if you will, that is
7 safe to go into the environment; I'd like to see more
8 information on the potential effects of methanol.

9 Q Another issue that has
10 attracted some comment and consideration is the question
11 of fish as a resource, and the utilization of fish as a
12 resource, and the question of resource management of the
13 fisheries. There seems to be a considerable amount of
14 concern about the use of the fish resource by construc-
15 tion personnel and by others, though Mr. Steigenberger,
16 amongst others, questioned this. Do you have an opinion
17 on the sorts of dangers that construction might pose to
18 fish as a resource?

19 A I'm acquainted with the
20 -- at least I've scanned the testimony to which you
21 refer and as this Inquiry knows, my opinion differs
22 from that of my colleagues. I like to turn an operation
23 of this kind into a positive rather than a negative
24 thing, if it is going to be approved, if you're going to
25 do it then milk every ounce of information you can out
26 of it. Now it seems to me that this is a wonderful
27 opportunity, if the project is approved, to obtain infor-
28 mation on relative catch and effort, if it properly
29 supervised. I think it's unfair, realizing how little
30 spare time the construction workers are apt to have

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1
2 to deny them the right to harvest fish along the route,
3 except in very few areas where domestic fisheries -- and
4 I emphasize "domestic" -- use fishery has been demonostrated,
5 and here you would probably wish to avoid conflict
6 between local users and construction workers. I see no
7 reason why not to permit the construction workers to
8 fish and either through the government, which is respon-
9 sible for this management of this resource, or through
10 some arrangement with the company to gather information
11 of catch per unit of effort. Never will they have
12 such a cross-section of good, bad, and indifferent
13 fishermen to collect this kind of information. It is
14 an excellent sampling technique on which future managers
15 could use to assess the resource. The data on domestic
16 use of the region by local people is extremely limited,
17 both the government witnesses and the company, that is
18 Dr. McCart's papers, Mr. Doran's papers all indicate
19 the limited nature of this. Only in the last few years
20 has the government started to collect the adequate kind of
21 information necessary and so the time frame here, our
22 time series is very limited. It's hoped that, in any event when the project
23 is approved or not, that domestic use data will be
24 collected. The commercial potentialities of much of the
25 region are extremely limited and this, of course,
26 is handled its own management procedural way ; but
27 as I noted in contrast to my colleagues, I think this is
28 a wonderful opportunity to turn an operation into a
29 positive data-gathering sense.

30 Q Your concern here then is

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2 to ensure that we gather as much data as possible,
3 rather than the desire to -- the exploitation of the
4 resource as such.

5 A My personal view is that
6 in this construction with recreational facilities have
7 to be limited for those that like the outdoors kind of
8 recreation. I'm sure that there are all kinds of plans
9 for movies and magazines. If you're going to go^{go}
10 out and fish, if someone likes to do this and this is
11 the only kind of outlet that he or she has, I think it's
12 a shame not to permit this and turn this desire into a
13 source of information. I think you can do both and I
14 think it's perfectly within reason to control this
15 operation.

16 Q Your desire then is to
17 have some control mechanism and secondly, to ensure that
18 there is information gathered from this expected use of
19 the fish resource.

20 A If this project is approved
21 and goes ahead, there is no doubt that in the future
22 the aquatic resource will be utilized in different
23 ways along the route. This will require management
24 by the responsible government agencies. In order to
25 manage you have to have some baseline information other
26 than just clear presence or absence. These data can
27 only come from sampling. Now contrary to one of the
28 other witnesses that said that he doesn't like to collect
29 totally by the use of toxicides and so forth, scienti-
30 fically that's the only way to get a good sample and

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2 complete sample. Fishing is a very biased sample.
3 It depends on so many variables, including human skill;
4 but in terms of managing this resource, be it for recrea-
5 tion or domestic use, you need to catch per unit of
6 effort information as well as some other things like
7 stock size. This is an ideal opportunity to get this
8 information so that the resource management agency can
9 know in advance what areas -- you're not going to be
10 able to do research along the whole route at once, but
11 this could be a mechanism to warn the management agency
12 that this area is sensitive -- I know that word is
13 sensitive before these hearings -- but that this area
14 is one that you should watch; this area has reasonable
15 ability to take recreational pressure and so on and so
16 forth.

17 Q Perhaps I can follow up
18 on that idea with you, Dr. McTaggart-Cowan, because I
19 want to deal with the question of the resource or the
20 management and so on and deal with some evidence you
21 gave when you were here, and in particular I'm referring
22 to your evidence when you talked about the question of
23 harassment, and the concern of the impact on the caribou
24 and Dall sheep which were the two large mammals that
25 you dealt with at some length. You seem to be concerned,
26 if I can summarize your views, at least as I understood
27 them, you seem to be concerned that even if Arctic Gas
28 did everything that they said they were going to do,
29 there were problems of harassment by the mere fact of
30 access, if I could put a label on it. Could you

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2 indicate therefore what sort of problems you foresee
3 developing and what direction you see research required?

4 WITNESS MCTAGGART-COWAN: Well,
5 I could make a start at it. The question of designing
6 research is something that takes time and more thought
7 than could be put to it at a time like this. But I
8 think we're, all of us concerned, I'm certainly not alone
9 in this, I think the evidence that's been submitted by
10 Dr. Jakimchuk, by Dr. Gunn and others has recognized
11 that one of the big changes introduced by the building
12 of a pipeline of this kind is -- or by building a high-
13 way -- is increased access. Over large parts of northern
14 North America, including the area we're now dealing
15 with, wildlife populations have flourished because there
16 was very limited access for people to get at them.

17 The pattern of hunting has
18 changed radically in much of Northern Canada in the
19 last several years, largely through the introduction of
20 all-terrain vehicles, one of which is the skidoo, which
21 makes it possible to get at populations which hitherto
22 have been out of reach, and to pursue them at consider-
23 able speed. Whereas formerly the animals were quite
24 able to run away from you and outdistance you, even if
25 you had a pretty good dog team they could out-distance
26 you.
27
28
29
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With a skidoo you can travel so fast that it is possible to harass an animal to the point of collapse or to approach animals simply by exercise of speed that you couldn't do before. This introduces speed and noise and hunting in concert which introduces a whole new element into the contact between man and wild species. There has been some interesting data generated elsewhere in North America with the technical studies of the impact of the use of snowmobiles on the environment and on wildlife.

It is possible to kill animals with a snowmobile just in attempting to photograph them, without any intention to shoot them, simply by over exercising them, and this has been done on more than one occasion. I am not aware of any cases in the north, the opportunity for observing them is not here.

So, the question of access becomes a very difficult one and it is one that for which the pipeline company really cannot be held responsible. If the operation is approved, it then becomes a matter of government responsibility. It becomes the responsibility of the control agency.

Now, a corporation which exercises control over access which could be a logging company with roads or a pipeline company with access routes or whatever, can get and can exercise some control over the access. It is more difficult to do it, perhaps in the terrain about which we are now talking, than it is in heavily mountainous terrain where everything runs along the valleys, things are easier to control.

The problem then of disturbance by access is a real one. I gave you an example a few moments ago of the sheep on Sheep Mountain in Kluane National Park being loved to death, if you like, by people who simply wanted to get close enough to them to get good photographs.

The problem of the measurement of disturbance is a most difficult one. My own personal view is that the consultants for CAGSL took the logical route in performing their experiments or their tests, because many of them are not really experiments. Experiments require the setting up of control systems in which only one factor is altered and that is very, very difficult to do in the wild scene. So, my own personal view is that it is logical to do rather rough cut tests on the first round, such as overflying by aircraft at 200 plus or minus 50 feet or whatever it is, you know, your altitude is only relatively well known. With bumps in the landscape, you are getting closer or further away all the length of time. So, it is a rough cut type of test.

I have read the details of the experiments done by Dr. Gunn and his colleagues and it seems to me the studies that they did on the disturbance of the snow geese were well done and give us considerable insight, in fact insight that is to me adequate to design the necessary mitigative procedures in terms of altitudes and distances and flight paths and so on.

It is much more difficult to do the same kinds of tests under controllable conditions

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with caribou and with sheep. Again, I think that a good start has been made, but the measurement of the impact on caribou, for instance, or on grizzly bear, is dependent, when you get down to the final details, you want to know just how much additional draw down on the energy on, let's say caribou particularly, because grizzly bears hibernate in the wintertime and get out of sight and conserve their energy, but how much initial energy draw down is being imposed on animals like caribou and moose particularly.

Really, the next step in that approach would be to use implanted radiosons which will measure heartbeat rate and relay it to you through a radio on the neck. The technique is well worked out. It is being used in various wildlife research projects in various parts of North America. The question becomes one of deciding, and this has to be a matter of judgment, as to whether this level of sophistication is required under the circumstances that now prevail, or are likely to prevail, and that is one that I would like to have more thought on before I committed myself.

Q Thank you. Mr. Adam, I wonder if I could turn to you then with a few specifics that have come up at this Inquiry. When you gave your evidence in June you expressed an opinion that chilling of the pipeline should stop south of the Willowlake River and in your evidence you describe the methodology. I am going to ask a series of questions on the methodology. Would you like to break now, Mr. Commissioner, or

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shall we -- I see that Commission Counsel is either
dying for a smoke or --

THE COMMISSIONER: Well, we
will break for coffee now.

(PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. MARSHALL: Before Mr.

Anthony begins, there's one small matter. I note that Dr. Thomson, who is also a member of the Board, is here. He unfortunately was away when the Board made its presentation and he wasn't able to give direct evidence. He is here, though, and he's a member of the Board and he's been involved in its report and its deliberations, and I'd certainly have no objection to him joining the panel that's being cross-examined so that he could be asked questions and express his views on the matters discussed.

THE COMMISSIONER: Well, do you wish Dr. Thomson to join you?

WITNESS TEMPLETON: Yes.

STAN THOMSON, sworn:

MR. SCOTT: Mr. Commissioner, before Dr. Thomson gets his chair up there, I frankly would prefer this not to occur, not that Dr. Thomson shouldn't make some contribution if he wants to do so, but the practice has been that if any witness is going to give evidence, that he should file a transcript of his evidence. Now in this case it's not without some importance, and if my friend and the request comes not from the Environmental Protection Board but rather from Arctic Gas, if Arctic Gas wants Dr. Thomson to give evidence, they may no doubt prepare him to give evidence in the way that other witnesses have done, and file for all of us a transcript or a summary of what he's going

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2 to say. They can't, in my respectful submission, attempt
3 to get the opportunity to cross-examine him by in jocular
4 fashion asking if he can't be inserted on this panel in
5 this way. Now this all happened in very accidental
6 friendly fashion, and I thought they were talking about
7 Dr. Andy Thompson, first of all, but it seems to me
8 that it is not proper to ask someone to join a panel
9 when it is in progress, when it's being cross-examined
10 on, when he has not filed a summary of his evidence and
11 it's simply for the purpose of cross-examining him.

12 MR. MARSHALL: Mr. Commissioner,
13 I think my learned friend perhaps didn't quite catch
14 my remarks. I said I would have no objection if he were
15 added to the panel. I wasn't moving that he be added to
16 the panel, and I'm not trying to have a witness inserted
17 so that I can set him up for some cross-examination.
18 That's not the idea. The point I think was simply this,
19 the Board has published a very extensive report that's
20 an exhibit with the Inquiry, and it's signed by all of
21 the Board members, one of whom is Dr. Thomson, and my
22 understanding was that because of some other commitment
23 Dr. Thomson simply wasn't able to speak to his work when
24 the Board made its presentation and just one of those
25 things, it just couldn't be arranged. Nonetheless, he
26 has joined in making the statement that's found in the
27 E.P.B.'s report and it seems to me that that document
28 having gone in, that it really wouldn't be necessary
29 for Dr. Thomson to give any evidence, but when the Board
30 is being asked for the Board's collective opinion,

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it makes some sense to have the missing Board member there if he's here in the room. We might as well have him on the panel so that his views can be asked as well, and he then could speak to any particular part of the report that he had responsibility for, and he wishes to comment upon; and that's really the purpose. If my friend has an objection to that, well that's fine. I'm not moving that he go on. I thought it's a matter of courtesy to Dr. Thomson, who's here, that it makes sense to have him up there so he could speak to his part of the report.

MR. SCOTT: Well, Mr. Commissioner, I persist in my objection. It seems to me it's for the Environmental Protection Board, which has put on this panel, to determine how the panel will be comprised and who will be on it, and what will be said. I don't know how Dr. Thomson comes to be here and I'm glad to welcome him, but he wasn't put on the panel by the Environmental Protection Board. That's that, as far as I'm concerned. If the Environmental Protection Board specifically requests that he be on this panel, of course, I would have no objection to that. If someone else wants to call him to give evidence, I have no objection to that; but I do object to his -- and it's nothing personal -- but I object to Arctic Gas's attempt to insert him almost accidentally at this moment in an existing panel so that he can be cross-examined by them.

My friend used the expression "set up a propos" of me once before.

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MR. MARSHALL: But it applied
then, Mr. Scott.

(LAUGHTER)

Well, sir, I'm content to leave
it with Mr. Templeton and the Board, if that's the way
that Mr. Scott would prefer to have it. I'm certainly
not persisting in this.

THE COMMISSIONER: Mr. Templeton,
I certainly think, notwithstanding what Mr. Scott has
said, that Dr. Thomson should join his colleagues on the
Board and he can add anything he wishes, and he can be
cross-examined but this is not to be regarded as a
precedent for anything, and not to be cited in the future
as a precedent. All right?

MR. SCOTT: Well, I object, Mr.
Commissioner. I think this is being done for an
entirely different purpose, and I simply want my objec-
tion on the record. The Environmental Protection Board
want to constitute a panel in a given way, I think they
should be entitled to do so, and my friend and his
advisors should not make any effort to manipulate the
shape of that particular panel.

THE COMMISSIONER: Well, I
thought this Board wanted Dr. Thomson, one of their
colleagues, to join them. It's up to you, Mr. Templeton.
I thought you all said "Yes" a minute ago.

WITNESS TEMPLETON: Mr. Commis-
sioner, I think we would like to welcome Dr. Thomson on
it, but I don't understand these things, as I've

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1 demonstrated many times, and I thought that we had -- we
2 were being questioned on the evidence that was given in
3 June, and that's why we didn't put him on here. Dr.
4 Adam gave the evidence in June on those things that I
5 think we're talking about and that I assumed that he
6 would be cross-examined on that knowledge. Now if you
7 want to ask Dr. Thomson these things, it's quite all
8 right with us. He signed the report and is familiar
9 with what we've given. He just wasn't available in June
10 to be here.

11
12 THE COMMISSIONER: All right.
13 Well, Mr. Thomson, welcome to your place, if we can
14 get you a chair it will make this welcome complete.

15 MR. SCOTT: Now that Mr.
16 Thomson has been added to the panel, I would like him
17 to give his evidence in chief. He is, as I understand
18 it, an engineer, and I know my friend, Mr. Marshall,
19 intends to ask him in cross-examination some questions,
20 but I think Dr. Thomson should give his evidence in
21 chief if he's going to be cross-examined on matters that
22 other panelists have given evidence on.

23 THE COMMISSIONER: Well, I
24 tell you what I'm going to do. We're not going to
25 finish the cross-examination of this panel this
26 afternoon so I would like Mr. Anthony to continue,
27 and others to continue with cross-examination and
28 perhaps this question of Dr. Thomson's evidence in
29 chief is a subject he can consider overnight. We just
30 only got him a chair, and I think he's entitled to

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an opportunity to settle down before we carry on, so
you carry on for a while, Mr. Anthony.

MR. ANTHONY: Mr. Commissioner,
to make Mr. Thomson's welcome complete, I merely want
to say I have no idea obviously what issues he may
cover in addition. I propose to direct my questions
continually to Mr. Adam because it's his evidence I'm
referring to, even though it's channelled in the area
of Mr. Thomson, and should in either this cross-examination
or subsequent cross -- or in particular any subsequent
cross-examination any evidence different than what has
been presented come forward, I would respectfully ask
for the opportunity to return to cross-examine Mr.
Thomson. I'm assuming the Environmental Protection
Board evidence will not be varied as a result of his
appearance, and if it is I would like an opportunity to
come back and ask further questions.

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THE COMMISSIONER: Right.

MR. ANTHONY: Mr. Adam, I will then direct these questions to you with respect to some of the engineering and the environmental engineering evidence that you led. You expressed your opinion when you appeared in June, that the chilling should stop somewhere south of the Willowlake River and in your evidence you describe the methodology that you applied in coming to this conclusion. Now, subsequent to your appearance, Dr. Owen Hughes and to some extent Dr. Peter Williams also dealt with the question of how do you decide when to stop chilling and this also described a methodology or prospective methodology and I am wondering if you had an opportunity to consider what they had to say and can comment as to whether this fits with or is inconsistent with the sort of methodology that you propose?

WITNESS ADAM: Yes. I have had the opportunity to read the comments made both by Dr. Williams and Mr. Owen Hughes and although their description of methodologies were quite brief, I could not find any conflict at all between their statements or between either of theirs and mine.

Q So, as far as you are concerned, the sort of approach that you propose and recommend to this Inquiry is consistent with the approach of these two gentlemen?

A Yes.

Q You also gave evidence when you appeared, about the environmental impact in the

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context of drainage problems, both surface and subsurface and we of course have examined this issue at some considerable length since last you were here and I wonder if you have had an opportunity of reviewing this evidence and I would like to ask you because in your evidence you said a further reappraisal will be required as more and more information comes out, your opinion as to what drainage problems currently exist and what problems have been identified before this Inquiry are not satisfactorily dealt with in your opinion?

A Well, this whole question of drainage in my view is part of this cut off methodology because the further you extend the chilling south, the more drainage problems you are going to have further south, as I see it. Now, I think basically what we are talking about is the subsurface drainage problem and the surface drainage problem. I have read considerable evidence on this and as far as the subsurface drainage through the frost bulb, and there has been mention of culverts, or insulated culverts carrying the subsurface flow from one side to the other, there is little doubt in my mind at all on this matter. I just do not think they will work.

Now, as far as surface drainage, I think that it is tied in with the subsurface. First of all, I might say that again, in connection with the chilling you have the frost heave problem, and the heave raises the ground above the pipe to a higher elevation than it was before it heaved, and this process is continuous from the time that you start chilling. So, I

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see the bottom of these cross-drains, surface cross-drains, as being raised in level with time, and the only way you can pass water at the same rate across those drains is to increase the head on the other side, that is, increase the water level, and as soon as you do that then you are talking about ponding, and I think that there has been enough discussion on that to indicate the problems there.

So, I see problems with both surface and subsurface drainage that have not been solved to my satisfaction. The other thing that I intended to mention was the interconnection between the subsurface and surface drains. If the subsurface drains do not work, then you force that flow over the top of the pipe in the wintertime and this then will induce icings within the drains, the surface drains, because they will be placed in the first place in the lower sections of the pipeline, and so, they are interconnected in that sense, because when spring melt comes, I can see problems with icings of even the surface drains, and then more ponding and so on. So, I have real concerns about the drainage.

Now, it can be alleviated to some extent by the point of chilling. I think that that is really all the comments I have on that.

Q And those issues that you have identified you feel should be examined in further detail before these techniques are employed, would that be your recommendation?

A I am sorry, could you

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1 repeat that?

2 Q We have had identified
3 certain techniques to be employed, such as the pipe
4 through the frost bulb and the use of culverts, etc., and
5 so that I understand what you are suggesting to us, are
6 you recommending, therefore, that these techniques be
7 examined further and further study be concentrated on
8 these techniques before their use is approved?

9 A Oh, definitely, I think
10 if they are in fact the ones that are going to be used,
11 I think that they should be tested, and of course if they
12 work, I would be very happy.

13 Q Another issue that has
14 very important consequences and therefore has been the
15 subject of some considerable discussion is the use of
16 snow roads and you were able to comment when you were
17 here on the engineering evidence that preceded you, but
18 since then we have heard environmental concerns about
19 the degradation of terrain and the viability of the
20 use of snow roads, and I am wondering if I might have
21 your opinion as to the use of snow roads, and in
22 particular on the north coast of the Yukon.

23 A Well, I think I would
24 like to start out on that one by saying when I first
25 got involved with snow roads I think that I was as
26 pessimistic probably as anyone, and I got involved in the
27 Norman Wells winter road tests and to a large extent I
28 became a believer, and with the Inuvik snow road tests I
29 think I can say that I even became more of a believer.

30 Now, going to the North Slope,

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I think here is another area where more testing could be done. I am a little concerned about the reaction of that terrain to snow roads, mainly because of, in some regions at least, the very high ice content in those soils. But, from what I have seen of snow roads, I can only say that I have no reason to think at the moment that they will not function on the North Slope. Of course, there is the problem of low snow quantities, and there is the problems even with the hauling of snow -- snow roads to and from the right-of-way, even for hauling snow to the right-of-way, and so I have other concerns about that and then there are other concerns associated with taking the snow off of lakes and rivers and so on.

Q So you would agree that the concept of snow roads is not at fault, it is perhaps the application in the particular circumstances, whether there is enough snow, whether it can be manufactured in enough quantities and so on, is that a fair statement of your position?

A Yes, I would think so. I think the Inuvik tests indicated that the hauling of snow is potentially a viable method of constructing winter roads. It is somewhat of an ideal situation there in that there was already a gravel road from the lake to the road and so on, but this is just a matter of constructing a little extra snow road. I would say as far as manufacturing that this is another case where if I saw it I would be more of a believer myself. I think that I am a little skeptical about that method at the moment.

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Q On this question of snow, I was wondering if I could put just a little bit different question to Dr. McTaggart-Cowan. Are you aware of any studies that have been done on the impact of snow harvesting on caribou or mammals? I'm thinking in terms now of the evidence that's been led about the use of snow fences and are you aware of any studies or have you conducted any studies on whether or not the impact of snow fences on caribou as distinct from the pipeline itself?

WITNESS McTAGGART-COWAN: No. I'm not aware of any studies. I certainly haven't done any. I can see the problem. I have been concerned about the North Slope on that basis, but I have no data whatever to go on.

Q One final question then, and this deals with an issue that is only now being discussed in a little more detail. When Dr. Banfield appeared he gave evidence about environmental assessment methods and techniques, and he also commented not only on those used by Arctic Gas, but on those used by the Environmental Protection Board, and talked in terms of environmental computer models that were used in other localities, and so on. I'm wondering whether Mr. Templeton or anyone else on the Board has any comments on the technique, the art of environmental assessment -- any comments on the environmental assessment techniques used by the Environmental Protection Board and by Arctic Gas and its other consultants?

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WITNESS WILIMOVSKY: Mr.

Anthony, I would respond to that question. I have reviewed and scanned the testimony and statements concerning environmental impact assessment and environmental predictions made by Dr. Banfield including his polite and complimentary remarks made about the work that we do at our institute at the University of British Columbia.

I would like to point out that there are different degrees of the use of analytical tools, and that there are no sharp lines between the techniques employed. I would like to point out that in our present society that there is a tendency to distinguish between subjective and objective data, or those that supposedly are quantitative as opposed to those that are qualitative. As a matter of fact, in terms of environmental prediction, in fact in all technological forecasts, both types of information are required, and if you can consider a field or an array with the two axes being one of resolution of the problem, how much detail you have, and the other axis being one of how much precision you have, both subjective and objective data fall down in this field as do qualitative and quantitative, and if you wish to look at it from a technical sense, it's something like the difference between the arithmetic situation and the geometry situation. Both are used in environmental impact.

I believe Dr. Banfield distinguished between impact matrices and inter-action matrices. One is just one level of another, and one part

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2 of his testimony he alluded with, I believe, approval
3 to the Nanaimo Environmental Assessment methodology as
4 an example of a good project, if I understood his
5 testimony. This particular assessment which uses
6 an inter-action matrix leaves out the entire project
7 and of course in environmental forecasting one should
8 include the project. But the technique that was
9 used and the one that I'm sure impressed Dr. Banfield
10 as it has others, including myself, is the fact that
11 this so-called matrix deals with more than two dimen-
12 sions; it deals with several inter-actions, the deriva-
13 tives in a sense of calculus.

14 Now one of the procedures that
15 the Environmental Protection Board examined, including
16 the use of computer models in employing this technique,
17 is KSIM. This is a simulation procedure of the
18 kind lauded by Dr. Banfield. It does use the inter-
19 action matrix, which is the higher order impact matrix.
20 So these are different levels of the same thing. The
21 Nanaimo study is -- the Nanaimo study uses the KSIM
22 procedure without the dignity of that title. These
23 various procedures have been developed at our institute
24 and are being studied by a number of people referred
25 to by Dr. Banfield, who cites their work as laudable.

26 I am not criticizing Dr. Ban-
27 field's opinions or comments. I'm simply pointing out
28 that in the Environment Protection Board's analysis
29 we considered ~~these~~ various sophisticated techniques in
30 terms of resolution and precision, and indeed carried out

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some work with KSIM . Because of time, because of insufficiency of data, because as every modeller knows, garbage in, garbage out, it depends on how good the information you put into a model to get reliable results, we only used KSIM in a limited way and went back to the field of putting together qualitative and quantitative information subjective and objective, across our field with one axis of resolution and the other one, precision.

In summary, I would say that there are a variety of forecasting techniques and a whole level of hierarchies. This Board considered those procedures and used the best of what techniques in light of the data that were available at the time we made our assessment.

Q Dr. McTaggart-Cowan?

WITNESS McTAGGART-COWAN:

A Just one supplementary point that may not have been completely clear. The Environment Protection Board, in making its assessment, used all the data, everything that was produced by Dr. Banfield's team, by Dr. Gunn's team, everything that was produced by our own researchers, all that we could get from other sources, it was all put into the assessment so that there were not two alternatives, one using different bodies of information than the other. That was supplementary information I would like to --

Q Mr. Templeton, did you have any further comments you wanted to make on this point?

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WITNESS TEMPLETON: I'm not sure what -- I was having some difficulty getting the conclusion of -- that Dr. Banfield was coming to, and I maybe have misinterpreted him, it's too bad that he isn't here. I think what he was saying was that he wanted things to be more quantitatively assessed. I think we all do. I think we've said that early in June that this is the ultimate answer and if you could only do it, you'd feel happy. But none of us have been able to do that for the simple reason that there is not the data on which you can do this. He used the Garrison River diversion as an example of a good impact assessment on a quantitative basis, and I would like to dispute the Garrison River example because although it's a highly sophisticated method that says that it's quantitative, as Dr. Wilimovsky says, it's garbage in, garbage out, and I'd like -- there is a report and I've read the Garrison impact statement very carefully and there is also a scientific and policy review of the final environmental impact statement prepared by the Environmental Assessment project of the Institute of Animal -- or Ecology, and I think there were 14 scientists from 14 universities at it, and I realize we don't want to talk about the Garrison diversion, but it's part of the system that we're talking about and how we're all having difficulty to know what we're getting to, and there's only one -- two sentences in this that I'll read. It's in the summary of this group of scientists' conclusion in the published document.

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"Further, the Bureau of Reclamation,"
and these were the people that made the impact statement,
"Further, the Bureau of Reclamation's analysis
of its own data is often inaccurate, insufficient,
or misleading. The project is described in a very
general and frequently tentative terms, and the
existing environment is considered in a most
 cursory manner. Major adverse impacts are ignored
and alternatives to the project are not considered.
It appears despite precautions to the contrary,
in the guidelines, that the final environmental
statement was prepared as a justification for the
Garrison diversion unit, rather than a detailed
analysis of its environmental impacts."

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Now, the reason that I bring this up is that it was a computerized thing and the whole idea is that you put something into a box and because a computer turns a result out, it is a quantitative method and I don't like those systems where you can't test what goes in and how it works and maybe it is my age showing, but I don't like to accept the idea of computerizing unless you can run the computer, unless you can check it. Otherwise, you have problems, but I talked to Dr. Banfield about this and he said, well, what you're complaining about, dishonest people put data in and that that doesn't destroy the method, and he is right, but the trouble is, if you can hide something, you leave chance for people to put their biases in and this is why I am always suspicious of these methods that hide something. But the fact still remains that we used a fairly subjective method. We tried to quantify in every one of those little squares in our matrix, how we analysed that and that is in the introduction to it and this was a need that eventually came to help us make our opinion. In other words, all of that work was merely to make our opinions better, but they are still subjective opinions, and when it came right down to it, I believe that Canadian Arctic Gas did the same thing, they didn't use these quantitative methods. I think that Mr. Hemstock testified that he made it and that he had taken the advice from everybody else and wrote his impact assessment of the pipeline, and I am not quarreling with him because I think that he did an honest thing, said what he did, where he got his information

Templeton, Adam, McTaggart-Cowan
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and made his opinion, and that is really what we do.

THE COMMISSIONER: Isn't that what we all do in a way, even if you dress it up with all these formulae?

A It is what we all should do because that is what science is, but some people -- maybe I am misreading Dr. Banfield, but when you say, "Oh, well, I have got a computerized method and I have got more than two dimensions in it", and so that when it comes out with a result that says the benefits are 1.247 times the cost, well, I get pretty worried about those things.

THE COMMISSIONER: Well, for instance, Dr. Bliss's cumulative, -- or examining the total impact on each route, he and Dr. Thomson must, when they decided what value to give any particular impact, there was, falling back on their own judgment, they can run it through a computer, do whatever they want, but it is still a Bliss and Thomson thing --

A Yes.

THE COMMISSIONER: And it is as much subjective as it is objective. At any rate, as long as we know that we are doing that sort of thing and not pretending that it is a wholly scientific process -- I was going to ask you, Dr. Adam, Mr. Parker, the Commissioner of Highways from Alaska gave evidence here and he wasn't very -- I don't know whether you read his evidence, but my recollection is that he was asked about the snow road tests -- Mr. Williams has told us at great length about the snow road tests, and he is the principal witness

for Arctic Gas in support of snow road techniques and so forth. Mr. Parker, who seemed to have a lot of experience in Alaska, said that those were interesting experiments, the Norman Wells test site and the Inuvik snow road test site, but he said that they remain unproved because there is no operational experience. I haven't looked at his evidence for months now, but that is the recollection I have of what he said.

He is really looking at it from the opposite angle that you are. You are saying "Well, those tests look all right, as far as they go, we don't know what would happen on the North Slope because of the problems of us getting enough snow", and you say that there is an additional problem, that is, the ice content of the snow.

Looking at it from another angle, so to speak, he is saying, "Well, those are interesting experiments, but they don't take us very far. I just wondered if you had any comment on what he said. You are being a little optimistic about those and perhaps rightly so about the snow road tests. He is kind of looking down his nose at them.

WITNESS ADAM: Well, if I could, I think I'd really like to defer answering that until I reread that section. I am just having a little trouble recalling exactly what he did say. The only thing that I would add at the moment is that there is certainly a lot more experience with snow roads than just at those two test sites. They have and are being used in the Delta, and other places --

THE COMMISSIONER: Throughout the valley. Mr. Longlitz gave evidence about that.

A Now, I personally believe that there is some confusion between what we call snow roads and what a lot of people call winter roads which to me are no more than winter trails. They in fact blade the snow aside just to gain access, say, with a caterpillar. Now, when we talk about snow roads, that is not what we are talking about. We are talking about actually constructing a road cross-section with snow, and thereby protecting the terrain. So, even when I hear people like Parker maybe criticize them, I am never sure exactly what they are criticizing, because I would criticize a bladed road as well as he would.

THE COMMISSIONER: That is a good point. The witnesses for Arctic Gas and Foothills have sometimes used the expression winter roads and I have assumed that they have simply meant snow roads -- and didn't mean the kind of road that you are talking about. But this is on the transcript and no doubt if Mr. Williams or his opposite number at Foothills had some particular distinction in mind, we will be advised one way or the other.

A I have recently written a couple of chapters for a book for N.R.C. where I spend a considerable amount of time differentiating between the different types, and to my knowledge it really hasn't been done before and of course it is a relatively new technique, icecapping snow roads and so on. So, I hope that that will clarify that and --

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THE COMMISSIONER: Well, to be fair, then you say that given the experiments that they have carried out ^{you have more or less become a believer} and you would subscribe generally to Mr. Williams' optimistic forecast of the use to which they could put snow roads, giving -- putting aside your reservations about the North Slope, generally you would be in agreement with Mr. Williams' optimistic forecast about the extent to which snowroads can be used on the project?

A Yes. I think Mr. Williams' recent testimony on the subject indicated that Gas Arctic has -- or I should say CAGSL has come quite a ways as far as the starting date -- that was really my major concern at the beginning.

THE COMMISSIONER: Well, you want to get into that, that is a very important issue. I was really confining myself to this assuming that you are talking about a road that you have in place in January or February so that we don't get into this argument about when can you build them -- is it mid-October or not even until January, but once you have got it in place it can be used to go ahead with the project that you can use it to build a project in the way that Williams has outlined to us. That is the point that I thought you were making. If you want to now get into the question whether they can build them as early as October, well, that is fine too, I would like to hear your views on that --

A We could leave that probably for another time.

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MR. ANTHONY: Well, perhaps not. I would like to, now that we have the issue before us, maybe get the distinctions down so that at least I understand what position you take. As I understood your initial statement, the concept of whether or not you can put vehicles on a snow road, you're satisfied that in fact you could construct a snow road to carry equipment and this, you feel, has been demonstrated by the snow road experiments. Am I with you that far?

A Yes.

Q Now the perspective that Commissioner Parker brought to this Inquiry was not in argument with the concept but a question of that he's not satisfied that it's been demonstrated you can actually use that concept on the North Slope. In other words, it hasn't been demonstrated in practice and he has reviewed his experiences in Alaska and so on. Now he doesn't agree again whether it's timing or whether it's the amount of vehicular traffic per hour or weight of the vehicles and so on, these are all variables, and his view, if I can summarize it, was he's not satisfied that the technique, which he doesn't disagree with, actually is in fact a usable and practical technique in the circumstances of construction on the North Slope. Now, are you with him on that level also?

A Well, I think if you can build a snow road on the North Slope, and compact it to a density of say .6 grams per cc., or what we call a rammsonde / hardness indicator test of something in the

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2 order of 450, then there's little doubt in my mind that
3 you could put traffic on it and it would withstand that
4 traffic. Now to me the problem is it's just one of
5 physically getting that road in place. If it's in place
6 and if it meets certain design criteria, then I think
7 it will work.

8 Q Perhaps this may be
9 over-simplifying it, what you're saying is the problem
10 is whether or not you can build it. Once you've built
11 it, you're satisfied it will work. Is that fair?

12 A Well, I see --yes, I
13 think I basically agree with that. I'm not saying that
14 they're not going to have problems with snow roads in
15 the North Slope. I think I ~~would~~ be happier, as I said
16 before, if we had had a test on the North Slope; but at
17 the moment I have no reason to believe that it will
18 not work on the North Slope.

19 Q Mr. Templeton, if I may
20 turn finally to you. In your evidence in June and in
21 your evidence again today you identified in environ-
22 mental terms a number of issues and problems or gaps in
23 the research or other things that should be addressed
24 and considered. Is the Environmental Protection Board
25 currently doing any studies on behalf of Arctic Gas
26 to evaluate questions of route change and these pro-
27 blems that you've identified?

28 WITNESS TEMPLETON: No.

29 Q You've not been retained
30 to do any updating of the studies in the work that you

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concluded in the evidence that you presented in your report?

A No, we do not have any funding for that.

MR. ANTHONY: Thank you. I have no further questions.

CROSS-EXAMINATION BY MR. BAYLY:

Q Mr. Templeton, on the 3rd of December when I was cross-examining Dr. Banfield and the panel that he was on, I invited that panel to agree or disagree that they had made certain assumptions when they were predicting the impacts that the Arctic Gas Pipeline would have on the environment, and I'd like to go over those assumptions with you and ask you to tell me whether these are assumptions that the Environment Protection Board started with or not, because you've come to some different conclusions from the applicant and it may be for this reason.

Starting on the volume for that day, No. 95, page 14425, the first --

A Do you want me to have a copy of that?

Q No, I'll read you these assumptions --

A All right.

Q -- because the rest of the Board may want to comment on them as well.

A Yes.

Templeton, Adam, McTaggart-Cowan
Wilimovsky, Craik, Bliss, Gourdeau
Cross-Exam by Anthony

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2 indicate therefore what sort of problems you foresee
3 developing and what direction you see research required?

4 WITNESS McTAGGART-COWAN: Well,
5 I could make a start at it. The question of designing
6 research is something that takes time and more thought
7 than could be put to it at a time like this. But I
8 think we're, all of us concerned, I'm certainly not alone
9 in this, I think the evidence that's been submitted by
10 Dr. Jakimchuk, by Dr. Gunn and others has recognized
11 that one of the big changes introduced by the building
12 of a pipeline of this kind is -- or by building a high-
13 way -- is increased access. Over large parts of northern
14 North America, including the area we're now dealing
15 with, wildlife populations have^{flourished} because there
16 was very limited access for people to get at them.

17 The pattern of hunting has
18 changed radically in much of Northern Canada in the
19 last several years, largely through the introduction of
20 all-terrain vehicles, one of which is the skidoo, which
21 makes it possible to get at populations which hitherto
22 have been out of reach, and to pursue them at consider-
23 able speed. Whereas formerly the animals were quite
24 able to run away from you and outdistance you, even if
25 you had a pretty good dog team they could out-distance
26 you.

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28
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30

Templeton, Adam, McTaggart-Cowan
Wilimovsky, Craik, Bliss
Gourdeau, Thomson
Cross-Exam by Bayly

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2 we are ready to accept the same degree of assumption
3 that Arctic Gas has. I think the answer is yes, but we
4 may not feel that they're going to as skilful or that
5 the government perhaps might be as skilful as they are.

6 Q It's therefore still of concern,
7 You accept theoretically I gather that men can be
8 controlled, but you're worried that on a project such
9 as the one outlined that they actually will be.

10 A That's right.

11 Q Now you may want to look
12 at these assumptions from that point of view too, and
13 I invite you to do that, that there may be things which
14 you feel are theoretically possible, but practically
15 don't happen, which give rise to concerns which you
16 may wish to express.

17 The next assumption at page
18 14427 is that the pipeline exists by itself in isolation
19 from a road facility across the North Slope of the
20 Yukon.

21 A Well, we used the assump-
22 tion that the Dempster Highway was a fact and that it
23 produced some effects because it was there. I'm not
24 sure I'm answering your question. I don't -- I'm not
25 very clear on what -- I should have read that thing,
26 perhaps I did but I've forgot it.

27 Q Well, actually the highway
28 that this question was concerned with was not the
29 Dempster but a road other than a snow road in support of
30 one along the Beaufort Sea coast.

Templeton, Adam, McTaggart-Cowan
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A Oh, I see. I'm sorry, my
other answer didn't apply then. We assumed that there
would be no road along the North Coast. We don't
recommend one; we don't feel there should be one.

Q And Dr. McTaggart-Cowan,
you have raised the possibility that because of possible
oil and gas reserves between Prudhoe Bay and the Macken-
zie Delta that that road might well become a fact, if
the prime route were chosen, taking away the incentive
to either find some other means of transportation or
some other route.

WITNESS Mc TAGGART-COWAN:

I have raised that question, yes.

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Cross-Exam by Bayly

1 Q Now, going back to the
2 third assumption there was a revision made in that at the
3 time that I was cross-examining. And that was based
4 on our, the concern that you have expressed that although
5 men can theoretically be controlled that a regulatory
6 agency might not be able to control them and that the
7 company might not be able to control them.

8 From that I understand
9 there is still a concern of yours.

10 WITNESS TEMPLETON: Yes.

11 Q And of that I suggest
12 is a point where perhaps Dr. McTaggart-Cowan and Dr.
13 Wilimovsky do not share the same philosophical viewpoint
14 in that Dr. Wilimovsky, if I interpret your remarks
15 under cross-examination by the Canadian Arctic
16 Resources Committee correctly, you see the sports
17 fishery as an opportunity to gather data which is not
18 being gathered to assist in future regulation of
19 fish resources. Is that correct?

20 WITNESS WILIMOVSKY: Yes, sir.

21 Let me put that into context. I have a mike right here.
22 In most construction spreads which we have looked at
23 and this is largely subjective analyses, an accurate
24 statistical analysis has not been done but in several
25 construction groups that have been casually studied the
26 proportion of people that make use of outdoor recreation
27 is minimal. The tendency after a hard day work at work
28 is to go in and maybe read the paper and go to bed and
29 if the men are working for several days a week with only
30 one day off, we have only got the one day in which a

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1 Craik, Bliss, Courdeau, Thomson
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2 small proportion usually less than 5% go out. An
3 example of the petroleum exploration in Northern
4 Alaska where the crews worked, this is I presume pre-
5 union days, long hours by choice because it was a good
6 paying job, only had, some of them, part of Sunday off.
7 Most of those people used that time to look after
8 personal affairs -- letter writing and so forth.

9 The number of individuals
10 that went out and used the recreational facilities were
11 minimal.

12 Add to the fact that most
13 of this construction was planned for winter, which would
14 mitigate against a lot of outdoor activity by many
15 people at all. And also, add to the fact that even
16 in summer in many parts of the construction route if
17 it should go along the coast there are very few days of
18 sunshine, there is a tendency to stay indoors.

19 The ardent person will
20 probably try to circumvent the regulations if he were
21 controlled and said "absolutely no" and I always like
22 to turn the situation into a positive sense. Faced
23 with a situation, get as much useful information out of
24 it as possible, just if you will allow me to spread a
25 little farther in answering this question, we have
26 limited experience in some things like river crossings,
27 silt addition and so on and so forth. In order to
28 establish standards, I would like to see the first
29 construction in this area be used as an experiment
30 so that as we go along we could refine that building

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design and anticipate problems.

I am looking for standards and so I think that with proper communication that people can be controlled though I do not like that use of a term. If we both understand -- if both parties understand the objective, the self-discipline, what will prevail, there are very few people in North America today that either from their own reading or the input from the media or their children are not aware of the conservation and environmental problems

Q Now, this is where you depart from Dr. McCart whose concern appeared to be with the North Slope as well as with the Interior that access was the real problem, not construction or operations and maintenance of a buried chilled gas pipeline?

A No, sir. I respectfully submit that you may have misinterpreted my response. I am talking about using the construction team to collect data on their days off when they are doing recreational fishing. I have the same concern as the other aquatic biologists, should a road follow any of this construction, that as soon as you open an area, you are going to bring in other people than construction workers.

You can control the construction workers, I don't care how you do it but that is a possibility if you choose to use that word but once an area is opened up through any communication

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Cross-Exam by Bayly

mechanism -- an airstrip, an ability to get a small float plane in, this kind of thing -- you automatically increase the impact and in this kind of impact I share the same concern as Dr. McCart and Dr. Cowan and all the other biologists that are looking at the cumulative effects of people getting in.

We are talking about two different situations. And when you are talking about opening up an area providing access, the degree of control that you have drops off drastically.

Q So what you are saying is that if it is going to be built, you may as well take advantage of it to study what fishing is going to be done anyway and at least gather the data rather than make it illegal so that nobody will come forward to say what they have done?

A The short answer is "Yes. Use the construction period to gather information so that you can intelligently manage and control the area when it has opened up to the general public.

Q And you want, as well as a rider to that general statement to make sure that this is only done in areas which are not used for domestic fisheries?

A Correct

Q And is that at present or used as domestic fisheries in the past or potentially, how would you define domestic fisheries for your recommendation?



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A The domestic fishery is one that is used for local assistance of for the people who depend on this resource as food. The ardent conservationist would characterize this kind of fishery as a "meat" fishery. It is a crude but accurate term. You are fishing to get nutrient as opposed to a commercial fishery where these fish are not necessarily utilized locally.

Q Now, we are still faced with this problem of how to define a domestic fishery in terms of whether it actually is in use at the time of construction or one that is used every four or five years or have you thought about that as a problem in the area through which the pipeline will pass?

A Unfortunately the data to answer your question in terms of a statistical definition are not available. There are historical records that go back to the earliest contact time of people, of visitors to the area with the local residents, on the use of certain areas for fishing.

A number of these sites have been recorded in the literature and even in Hudson's Bay Co. records, missionary records and to my knowledge no systematic attempt has ever been made to extract this available information and to summarize it. It would be a fine project for some group that wants to study trends in domestic fisheries.

My own suggestion would be in terms of control and regulation. That if a

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2 fishery had been used in the last few years because
3 fisheries do fluctuate, the people vary where they fish,
4 people vary in their locations where they fish, that if
5 there has been some indication of use, say over the
6 last five years, that I would tend to keep people from
7 these sites.

8
9 Another factor is that most
10 of these domestic fisheries as far as we understand
11 today, are rather localized. You could circumscribe
12 the area quite nicely on the basis of available infor-
13 mation where this activity is going on. It would be
14 very simple to declare it off limits or out of bounds
15 to any fishing by non-local residents.

16 Q One of the problems that
17 came up in the examination of Dr. McCart and I don't
18 know whether you have read his evidence or not, sir,
19 was that for certain species which are fished domesti-
20 cally, there is very little known about some of the
21 areas in which they spawn and overwinter and I would
22 like to suggest to you, Dr. Wilimovsky, that fishing
23 in some of these areas might have an impact on a
24 domestic fishery even though the domestic fishery is
25 carried out at another time of the year in another
26 part of the water system. Would you agree with that?

27 A No, sir, I don't. If you
28 would follow, if the recommendation I made a few
29 moments ago could be implemented, mainly that you have
30 a real time assessment of the fishery by the sport
activity, the recreational sport activity and if these

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recreational people all of a sudden start harvesting species "x", that is a dominant food source of a village 20 miles away, you could close it. Now, I am talking about a real time analysis if it is going to be properly managed this is what you need.

Now, also most of the fish that are used it would be attractive in a sport way, appear not to always be the dominant catch for domestic use. The material provided by the Department of the Environment, by Dr. McCart's data, by data by Mr. Doran and the historical literature shows a dominance of whitefish species as those that are stored, char and one or two other types, we are talking about a relatively confined, well-circumscribed group of species that are used in domestic fisheries.

Most of, many of these don't take the hook readily with the exception of the char and the number and kind of fishes that the sport fishermen are going to take aren't apt to cause too much competition with the home use fishery. As I say, if it is monitored, there should be no problem. The thrust of my response, sir, is that we are talking about a small proportion of people making recreational use in a fine opportunity to provide data for the protection of domestic fisheries and future sport fisheries brought on by the impact.

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Q Now, can we go on in the assumptions that I invited Arctic Gas witnesses to agree with and it is found at page 14429, that is, that you must also assume that a project, no matter what size it is and what it costs can be stopped and will be stopped by the applicant if the environmental concern that you express or have expressed is compelling enough, and that isn't stopped forever, or stopped for a period of years, that is when the environmental monitor says that this is the time that is very important for the caribou, therefore, we must stop for a few days to let them go through, that this, in fact, will be done. Is that an assumption that you made, Mr. Templeton?

WITNESS TEMPLETON: Yes, we've made that assumption and that again is part of the job of management. If you set the management up properly and get everybody trained, I think that you can probably do that. Now, it is a very difficult thing to do to stop the pipeline spread from working, and we recognize that and it is going to be -- we know that it is going to be so difficult and this is why we want the training of the inspectors and the hierarchy of both to be in agreement so that there is going to be less chance of that having to be used.

Q In practical terms, having looked at a large number of potential impact areas between pipeline related activities and various inhabitants of the environment, do you feel that the project can actually go on without having to ignore some of the impacts that will happen having to scale them and say

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that anything below a certain size we'll just have to keep on going for?

A I think that we tried in each of those things, those little squares in our matrix, to assess in our own mind how likely was this to happen and we started off with the worst possible matrix and then we gradually worked it down into what is likely to happen and the pessimists and the optimists started arguing and the different disciplines started arguing, but we felt that these were reasonable assumptions that we made providing that we could get them to adopt a code and an organization.

Q The next assumption is found at page 14431 and it deals with government, and do you share the assumption made by the applicant, Arctic Gas, that for the purpose of coming to the conclusions you come to, the government would be able to create regulations and a regulatory agency which would be able to monitor the project from the public's point of view?

A Yes.

Q Now, given the time frame that exists, the potential schedule and the fact that we don't have an agency created at the moment, or a series of agencies created at the moment specifically for this project, do you still feel in practical terms that that is likely to be done?

THE COMMISSIONER: That what is likely to be done, that the agencies are likely to be created?

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MR. BAYLY: Yes.

THE COMMISSIONER: Well, that is speculative, isn't it? Who can predict what is going to happen?

MR. BAYLY: Well, Mr. Commissioner, one of the things that was said by the Environment Protection Board in their evidence in June, as I recall it, it was that if we are going to have an agency to look after this project, then they should have started before, but they definitely should start now to prepare for it --

THE COMMISSIONER: Yes.

MR. BAYLY: -- and we are now six months down the line from that and --

THE COMMISSIONER: Well, there is some indication in the newspapers that they have begun plans to establish the Canadian Pipeline Authority. But what good does it do to have Mr. Templeton's opinion as to whether they will get around to establishing such an authority or not? We could take a vote of everybody in this room -- what's the difference? Am I missing something here?

MR. BAYLY: Only this, sir, and you may not be missing anything at all, that if we are going to make recommendations to you, sir, on the timing of this project, that if Mr. Templeton and his panel say that it takes two years to create an agency and train the personnel, then we would like to recommend that it not go ahead until that time has been allowed for that process to take place. In that point of view it is very

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important, I would submit.

THE COMMISSIONER: Well, let's assume that the agency doesn't exist now. It doesn't.

A I didn't hear you, sir.

THE COMMISSIONER: Well, there is no such agency now, apparently. The National Energy Board might constitute such an agency, a department of government might, or the embryonic Canadian Pipeline Authority might, but these are matters for the government to determine.

If we were to be concluding the Inquiry today and you were giving evidence would you say that it takes two years to establish such an agency so that it is in a position to get underway -- that is what Mr. Bayly sought to elicit from you, as I understood it.

MR. BAYLY: I don't want to put a period of years into Mr. Templeton's evidence, because I don't know what the period would be, but he may be able to suggest a period of time in his opinion that it might take to get this thing into motion.

A I don't think that I can give you the time at this time that would be required. I think that there is still time to form the agency. With a concerted effort I think that it could still be done, and it could be possible, however, that one of the terms and conditions that might be recommended to the Commissioner is a certain time lag so that the government forces can be able to meet the decision dates so that because the government, or agency would have to approve

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certain actions ahead of time and they should be organized to do that because the applicant will, the minute he is given a go ahead will want to order equipment and make certain decisions that are going to have serious environmental effects.

Q Now, with regard to the agency that you were discussing earlier this afternoon in your evidence, do you see a role for the public to play in this?

A Yes. I think -- we suggested this environmental auditor group because there is a great deal of public concern about the project, there is about the north in general, and the government agency is going to have a very definite role to play. It is in the line of -- it is a doer just the same as the pipeline company and I think that they require somebody to have some kind of an audit, an environmental audit periodically and report to the public so that they have -- the public can feel that everything is being done. I think you'll notice in Alaska that there is considerable amount, from the news media reports, there is considerable concern are they really doing the things that they said they were going to do? Are they following the stipulations? And I really think that should be done in Alaska, but that is another country and I hope that it would be done here.

THE COMMISSIONER: Well, pausing there, what about the council that I think Dr. McTaggart-Cowan and Dr. Wilimovsky are members of in Alaska? Isn't that right? -- Well, that was established by the Arctic Institute of North America. It has no government or statutory mandate, is that right?

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WITNESS WILIMOVSKY: The Arctic

nstitute was instrumental in bringing together the
of the Council.
formation / It was formed at the request of a number
of environmental groups. Also contact was made with
the construction companies involved in the line to
assist in providing data in logistic support in
the field facilities. Because of some of the associations,
not all conservation groups agreed that this was the
procedure to follow, and some chose not to make
nominations to the council. The council, by its own
terms of reference is supposed to make a minimum of
two trips into the field each year and report these
things publicly, to receive commentary from the general
public, concerned citizens in Alaska and respond to these.
You place me in an embarrassing position because,
largely because of funding, I am told, the number of
visits made by the council is somewhat less than
desired. The reporting to the public has been less frequent,
delays in printing and so on and so forth, I personally
-- and I emphasize that I speak as an individual on
this -- would like to have done. The problem that
Mr. Templeton referred to about environmental auditor
groups is a considerable one, and how to implement, ^{the group} how
to have it effective, as I indicated in my June testimony
now to make sure that you have access to see parts
of the spread when you want to see it, not when some-
body else wants you to see it.

Q I take it one of the
other concerns, Dr. Wilimovsky, is that you also have

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2 access to whatever the governmental agency has access
3 to in making their decisions, and that you can appraise
4 them on the basis on which they are made.

5 A I want to divorce my
6 reply from the Arctic Environmental Council that operates
7 in Alaska. ^{should be kept distinct from that.} Indeed, most of what I have to say, I
8 think that it all depends on what objective of this
9 auditor group is. If it's preventative in nature, just
10 preventative in nature, you certainly want access to
11 government decision-making data. If it is a monitoring
12 group, it's a different kind of information.
13 I don't conceive of an environmental auditor group as
14 simply another inspector. I see it as a combination
15 of reporting to the public and suggesting through normal
16 channels, not the wild approach, if you will, on remedial procedures.
17 I think that if the environmental monitor group sees
18 protection problems that the company and the government,
19 as well as the public should be informed.

20
21 This requires a very active
22 role and some of a staff. I believe in my earlier testimony
23 when I went into this in some detail.

24
25 Q Now we've heard some
26 evidence from Arctic Gas' witnesses in particular to
27 say that the machinery is already there, and to control
28 this project, that there are Statutes, that there are
29 regulatory agencies, that there are officers in
30

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2 Fisheries Departments, in Wildlife Services, land use
3 inspectors, etc. Would you agree that these are
4 adequate, or would you feel that they just are not
5 adequate for this project?

WITNESS MCTAGGART-COWAN:

6 A Are you asking me, sir,
7 or Mr. Templeton?

8 Q I invite whoever wishes
9 to answer, and you have the microphone, sir.

10 A My own -- if you're asking
11 me the same question that you asked Mr. Banfield on
12 page 14431, you put it in slightly different terms.

13 Q Go ahead, sir, and answer.
14 Then we can compare them. You're referring to the
15 question --

16 A Do you assume for the
17 purpose of coming to this conclusion?

18 Q Yes.

19 A I think we had to assume
20 that these regulations could be put in place, and that
21 we did assume in reaching our prediction of the environ-
22 mental impact that could happen; but I would like to
23 include with that remark that you are aware that we,
24 in making our final statement, we said, "Conditionally
25 acceptable."

26 The condition arose in my own
27 mind largely from my reservations that all these things
28 which we assumed in reaching the "could happen" indeed
29 would happen. This was the difference between the
30 two matrices which we produced. The possible and the

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2 probable. The probable included our misgivings about
3 certain things that would go wrong, and since then
4 several of us have had quite a bit of experience with
5 the Alaskan scene and Murphy's Law applies beautifully.
6 If something can go wrong, it will go wrong, with the
7 best intentions in the world.

8 Q All right now, with
9 regard to those regulations which exist and maybe Mr.
10 Craik would like to respond to this, were you as a
11 Board satisfied that there exists sufficient regulations,
12 agencies and personnel to do this monitoring job at
13 present?

14 WITNESS CRAIK: Well we
15 see the problem primarily as one of organization
16 rather than the problem of there not being sufficient
17 legislation. There is the Fisheries Act, which you
18 mentioned as one of the oldest and perhaps the strongest
19 Acts historically that we've had in Canada for
20 protection of the fishery. There has been newer legisla-
21 tion since then dating back only to about 1970 that
22 allows a sufficient latitude, if you take the Fisheries
23 Act, the Canada Waters Act, and the other provisions
24 in different -- I think I listed the last time 40-odd
25 Federal Acts alone that from a Parliamentary point of
26 view the authority is there to do it, it's a matter of
27 organizing it to control a project of this intensity,
28 and our concern has been that with the diversitation
29 of responsibility that if it's simply left in the
30

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2 present state of having the different federal authorities
3 and the territorial authorities each looking after what
4 they have traditionally looked after, then it would be
5 a very cumbersome chore and probably justice wouldn't
6 be done to the exercising of proper restraint and con-
7 trol in the interests of the environment, and it would
8 not on the other hand be in the interests of the project
9 either to not do something about it; and this is why
10 we feel that the problem is mainly one of organization
11 to bring together the legislative authorities and the
12 regulations and whatever you might call the other things
13 that might be developed stemming from the legislative
14 authorities to bring them together into a body that can
15 exercise it effectively. Mainly it comes back to being
16 a problem that this is a project that has never been
17 undertaken on this scale in Canada before, coupled with
18 the fact that people are not going to accept the
19 environmental injustices that may have gone on in other
20 projects historically in Canada. If you combine those
21 two things, then it dictates bringing together a much
22 more effective administration of the powers that
23 already exist but are scattered too widely to be
24 effectively brought to bear.

25 Q And when you were envisag-
26 ing a single authority to co-ordinate all these pieces
27 of legislation which you feel exist and could be used
28 in the project, did you contemplate the possibility of
29 an agency becoming too big, too powerful, the kinds of
30 complaints that people often make about large agencies

and the way that we can do it is that they could.

A: This is one of the reasons that we wanted it to be a self-restoring system at the end of this very large project. It would not continue in existence; but I think that the system itself, because of the concentration now of attention that is going to be given might provide an excellent mechanism to then at the end of the construction period go back to the traditional ways, maybe not traditional in the sense that everybody does the same thing they did before, but to take back with them probably a lot of enlightened experience or what -- on how to enforce most effectively environmental protection. We see it as a mechanism to perhaps to repeat again, to bring together a very effective group for environmental administration. It may then bring about an ongoing responsibility in the regular departments. It doesn't require the continuance of this authority. We don't -- we're concerned on the second hand of creating a second or not a second but another bureaucracy that is on the line like we've seen in so many cases of another example. I'm sure there's two sides to every case, but one can go way back into the history of creation of the PERA that was set up decades ago for a particular reason in Western Canada, I think during the depression years in the 1930's in Western Canada, and is still in existence, and has simply been--

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THE COMMISSIONER: Does that help farmers pay off their mortgages or something?

A P.F.R.A.? -- the Praire Farm Rehabilitation Act was the -- it acted across Manitoba, Saskatchewan, Alberta. It was set up as the federal agency to do particular things to assist the plight that existed in western Canada at the time in the thirties and has created -- has never, is still in existed and constitutes a very large technical body made up primarily of engineers, of course, something like, perhaps like their counterpart might be the corps of engineers in the United States, but on a much smaller scale, but nevertheless, never was disbanded and had the authority, you know, filtered back to where it should have been, perhaps, in the different provincial responsibilities and as a result we don't want to see that happen. We don't want the pipeline authority to be a superimposed authority after the project is done, just because they don't know how to disband it, but we are suggesting that very carefully that provision be made at the start that it not go on into infinity after it is created.

Q Well, I think -- if I may say so -- Mr. Craik has put that whole thing in capsule form about as well --

MR. BAYLY: I wasn't going to muddy it by going any farther --

A I don't have anything against P.F.R.A. in particular either, but --

THE COMMISSIONER: Someone

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appeared before the Royal Commission on corporate concentration. I think that this is where I read about it and gave them a list of all the agencies that exist under the Federal egis to administer people and things and businesses and it came to 117, and no doubt all of them regarded this temporary expedience at the time.

MR. BAYLY: Now, one more area, and just a couple of questions on it. If we can go back to you, Mr. Templeton. We have heard you talk today about the difficulties in assessing impacts with a certain level of data and you dramatized this by showing the example of the Garrison project where certain things were not considered and certain data -- and as I understand your evidence -- were not available, and we have heard evidence from the environmental consultants from Arctic Gas with regard to the data that they collected and from that data they have expressed with some varying degrees of confidence, an ability to predict impacts and if I understand your evidence this afternoon correctly, it appears that you are less confident that with the data base that they have, that they can take that step to predicting impacts. Would that be a fair appraisal of what you said this afternoon?

WITNESS TEMPLETON: Yes, I think probably that is so. I think when you -- not being a scientist perhaps I am more skeptical of so-called scientific proof than perhaps some scientists, or perhaps one of the scientists on the Board should express it. We just don't have the length of observation, like the time of observation to be able to prove anything

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scientifically, in my opinion. What we are doing is using -- there has been a lot of good research done, but we are using that in a subjective manner and some people are more optimistic than others, I suppose.

Q Now, I gather that you would agree with me that most of the data collected by the applicant was baseline data in areas where there was a lack of that?

A I think that there is a lack of data in everything in the north. I don't know if that answers the question.

Q All right. They did talk in their evidence, to be fair, of certain experiments from which they had also said that they could predict certain things.

A Yes.

Q Now, when you examined those were you satisfied that the things that they said they could predict were ones that you would be confident of?

A I could stumble through this, Mr. Bayly, but I think that perhaps Dr. McTaggart-Cowan, who is a scientist, and who has studied these experiments, could do it better because he has gone through the business of scientific investigation and --

Q All right, well, let's let him do that and perhaps, Dr. McTaggart-Cowan, you could address yourself in particular to the remarks that you made this afternoon about being satisfied that Dr. Gunn's work allowed the applicant to predict certain things. Now, you seem to be satisfied with some of his

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work, and I don't know if your satisfaction goes beyond that to some of the other areas.

WITNESS MCTAGGART-COWAN:

Well, I don't want to depreciate the work that was done by the various people that did it. I think as I tried to make it plain earlier, that in planning research of this kind you have to move in in stages, in progressive stages, that you try to do the things -- once you have designated your objective, the kind of information that you feel you must need, you take the first step which will expose the information, the baseline data which will allow you to draw certain hypothesis which will allow you then to make some proposals which you then proceed to test further.

I think the work that Dr. Banfield referred to included tests of overflight of using both helicopters and fixed wing aircraft on caribou. It included tests of the impact of landings and take offs and overflights of small birds. The only bird that was abundant enough to yield statistically significant data was the Lapland longspur which was unfortunate because it is a bird of certain rather special attributes which may not be giving information of a generally applicability. But up to that point it was good data. They did tests of overflight using two different kinds of aircraft at least and made observations of another kind of aircraft on snow geese on the mustering grounds along the North Slope. They did noise simulation studies which purported to simulate the noise emanating from a compressor station. In their volume in which they

describe the design of the equipment, they give the basic data which would permit another person to duplicate their experiments which is a first essential in designing the experiment. Their details were specific enough for me that I feel that I could go and do the same experiments which is another one of the important things that is the basis of scientific experimentation.

Using that simulator they exposed geese, caribou, and Dall sheep to these contacts. Because of the numbers and the opportunities for getting quite large bodies of data, the results from the snow goose tests seemed to me to be further along the line than the results that were achievable with the caribou.

14 They did some experiments -- I think it was on the
15 overflight of nesting eiders and certain other nesting
16 birds on some of the big spits, offshore gravel areas
of the Yukon coast, and quite expectedly they found that
18 eider ducks don't move. You can lift an eider duck
19 off her nest. They really didn't have to do too much
experimentation to find out that eider ducks don't move,
21 but that certain other birds did lift and exposed their
22 eggs to predation by creatures, by mainly Point Barrow
23 gulls, glaucous gulls.
24

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These experiments were, as I said earlier, they were good opening experiments and using those, and I'm sure Dr. Gunn, Mr. Jakimchuk and Dr. Banfield would in fact agree with me, using those you set up the mix of experiments that have to be done to further elaborate, provided the early data leads you to the conclusion that more intensive information is needed.

The question of the impact of disturbance on caribou interests me particularly. The behaviour of these large mammals is, if I could put it this way, more sophisticated, than it may be in certain birds. In other words, there are levels of response that are not so obvious in the way that the observations were made. These were relatively crude observations, how many birds get up and leave, how far away is it?

If one is interested and has reason to be interested in the increment to energy expenditure which this disturbance is imposing upon mammals, then one needs a more sophisticated measure of what is happening within the animal, and this measure is reflected in such things as heart-beat rate, air volume that is being passed through the lungs, it can be monitored at even more sophisticated levels which I certainly wouldn't suggest in this kind of operation, by measuring the output of the adrenal glands which starts the whole escape or alarm mechanism into action. Dr. Geist appeared before the Commission, the hearing,

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and made some suggestions about the way in which these experiments might have been set up , to take the next step, and I agree with the suggestions that he made as to the next step that should be made under certain of these circumstances.

I find it very difficult to decide in my own mind if I were called upon to say, "Now, where do we go from here?"

It would require -- I would require to take a long, searching look at just where we had reached and to return to the caribou situation, one would want to satisfy oneself that there was a reasonable chance that the animals at some period in their life history, some period probably in the 12-month cycle, were very close to the exhaustion of their energy reserves. If I was satisfied then, I would find it necessary to go into more detail in further experimentation on this whole energy question. My own research team built one of the first respirometers, large animal respirometers in Northern Canada and we worked with deer largely, though since then our instrument has been used for caribou studies by Dr. McEwan of the Canadian Wildlife Service.

We put animals into this respirometer and we measured their output. It was also used for measuring the output of athletes in the university and so on. It's an adaptable instrument, and we measured the amount of energy it takes to rest, to stand, to move. This has been done by other scientists

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in other parts of the world, and the kinds of levels that Dr. Geist has suggested in his publications are real, that you do increase from let's say the basic of one to two times the energy consumption for resting, to up to five times, it's sometimes as high as six times in heavy climbing, doing heavy work, let's say in deep snow. When animals are being forced to exert themselves violently under different circumstances, on a slope in deep snow where actually they can draw down their energy reserves terribly fast, and it can make the difference between survival and death.

That's been a fairly prophesial long-winded answer to what started out to be a fairly terse question.

Q Well, can we bring it into focus, Dr. McTaggart-Cowan, from this point of view? Do you feel that taking the step from the data of the experiments that have been done by the applicant to saying, "We can now predict the impacts of this construction and this pipeline on the various species of plant, animals, birds and fish," is it too great a step to take at this point, or a step that is logical to take at this point?

A Well, we used the same data, in making our predictions, so I don't quite grasp the import of the question.

Q All right, I realize you used the same data that had been collected by the applicant, because you were appraising what he had done.

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A No, we were not appraising what he had done. CAGSL has been passing their information to us, this was part of our agreement, part of the way that the Board functions, and they have done this and we used it as the basis for our assessment and we were not assessing in a critical sense. This was information coming to two groups, their own group of assessors and us as a sort of standby or backup group of assessors, an independent group.

Q All right. You have said, though, Dr. McTaggart-Cowan, that you prefer the interior to the coastal route.

A Yes.

Q For potential impacts on the Porcupine caribou.

A Right.

Q Now you used the same data.

A That's right.

Q And you came to different conclusions.

A Right.

Q Why?

A Because of the subjective judgment and it hinges very largely on judgment about the relative sensitivity of caribou to impact, in my own view there are several things that bring me to this assessment. In my own view, looking at all the evidence that I can see, now this is evidence gathered from

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published sources other than the CAGSL evidence but it emanates from the CAGSL evidence. The CAGSL evidence showed quite clearly that the distance at which caribou became alarmed was greatest on the calving grounds, and during the mustering time, post-calving aggregations when they were under heavy assault by bot flies and warble flies and mosquitoes.

Now this to me indicates the most sensitive time. Beyond that, as a student of animal behaviour, I know that the time between the birth of the calf and its development of the imperative relationships between the calf and the mother is a very critical time, and anything that will impact on that time that will serve to disturb the caribou early in the birth sequence and later when they are already stressed to me is the time of the year in which the animals are most subject to damage.

Now this is a perfectly legitimate difference on point of view. I think I'm quoting Mr. Banfield, Dr. Banfield correctly when I say that he feels that the time when they're most subject to impact is when they are migrating and they might be deflected from their migration by impact of the pipe or by contacting the pipeline in the interior route. I am led to the conclusion that this is not so, and it seemed to me that elsewhere in the evidence introduced by CAGSL was the statement that they thought the pipeline when contacted by caribou would have minimum impact on the caribou. We have seen the caribou continue to cross

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the Porcupine River, and hunted there traditionally year after year. Research biologists from the Canadian Wildlife Service and from Research Teams associated with the project have been capturing and live-marking and releasing caribou at the crossing site. They continue to cross there. They come through Old Crow several years out of every five. I think they missed a year but are back again this year. So I don't think the buried revegetated gas pipeline placross the interior route will impede the migrational movements of caribou in any way at all, and we've been assured by CAGSL's evidence that, I think under direct questioning, that the number of low-level flights along the pipeline to make sure of its normal functioning ingegrity would be one to two a month, and gain I don't think that this will have a significant impact on the caribou along that route.

Q Take this problem and look at it from this point of view, sir. We have research that you say was well-done and by people whom you respect for the applicant, and it leads the scientists, Dr. Banfield and others, to conclude certain things about the caribou. Other people, both the Environment Protection Board and other agencies, etc., Dr. Geist for one --

A Dr. Calef for another.

Q -- Dr. Calef for another, have said, "No, that's not so."

Well, it leads the person who

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2 is not a caribou expert to the problem of weighing the
3 experts. Now, do you --
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THE COMMISSIONER:

Calef and Geist say what
is not so? I missed that.

MR. BAYLY: Say that the
impacts of the -- they say that the conclusions of the
applicant, that the Prime Route is more acceptable
to the Porcupine caribou herd than the Interior Route
are not so in their opinion.

In other words, the applicant
prefers one route, Dr. Calef and Dr. Geist and Dr.
McTaggart-Cowan prefer another --

THE COMMISSIONER: The Interior --

MR. BAYLY: Right.

THE COMMISSIONER: Yes.

MR. SCOTT: I don't think
that Dr. Geist has ever said anything like that.

THE COMMISSIONER: Well, leave
him out of it for the moment. Dr. McTaggart-Cowan agrees
with Dr. Calef in seeking to have the pipeline built, if
it is to be built, along the Interior Route.

MR. BAYLY: Well, what I want
to know, sir, and this is my question to Dr. McTaggart-
Cowan, is is this an area where we need more work to be
done so that those people with differing opinions can
have more evidence upon which to base their opinions or if
at we at the stage where experts are divided in their
subjective opinions on data that has been collected,
we are left with only the ultimate experiment, that is
the pipeline, to determine who was right and who was
wrong?

A That is an interesting

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question. The easy answer of course is always we need more data. I am trying to turn over in my mind where additional data would make the decision easier.

THE COMMISSIONER: Now, Mr. Bayly is talking about the choice between the two --

A I thought he was asking whether the questioning -- whether the analysis had reached the point where some additional data would help resolve the differences between the two groups which are giving advice based on the data --

THE COMMISSIONER: Yes --

MR. BAYLY: That is not the question, sir.

THE COMMISSIONER: Well, let me throw my two cents worth in here. I got the impression that you felt that additional experiments and so on and so forth would not be likely to move you from the opinion that you have adopted regarding the avoidance of a prime route, having regard to the importance that you ascribe to the calving period and the post-calving aggregation. Mr. Bayly takes it a step further and says, well, would it help to resolve these differences between Banfield on the one hand and -- see, Banfield said, he said that the winter is when the fetus is being nurtured and that was one of the principal reasons he gave for saying avoid them during the winter migration, or when they are on the wintering grounds, and so given this -- and Calef and you say no, it's this calving period and this post-calving period that's absolutely vital. Well, all right, you give us your comments on all

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1 of this. I am sorry to interrupt.

2
3 A There are quite a lot of
4 areas of disagreement. I have got 28 areas of agreement
5 on caribou and about four pages of areas of disagreement
6 on caribou.

7 THE COMMISSIONER: There have
8 been a lot of areas of disagreement. We have listened
9 to these people and listened with great -- to our own
10 great benefit, and I think they have perhaps learned some-
11 thing from each other, but I am sorry to kind of prolong
12 this, but I think that you have gotten to a pretty
13 important question and --

14 A This is a very important
15 question, sir, and I think that perhaps I can tell you
16 a little bit more of this sort. The caribou breeds in
17 October, sometimes as early as September. The fetus
18 grows very slowly in the early part of the winter. It
19 grows very rapidly toward the latter end of the winter.
20 When, if the mother has encountered deep snow and poor
21 feeding, she is in poor physical condition. We have done
22 a lot of work of this kind on coast deer using
23 experimental -- they are smaller, easier to work
24 with, the principles are the same.

25 If the animal, if the female
26 has been very badly undernourished, she gives birth to
27 an undersized calf with a very poor likelihood of sur-
28 vival. Also, if the female has been seriously under-
29 nourished, she will not produce enough milk, so that
30 you find evidence of this in undernourished females
31 producing undersized calves with a high deathrate at

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birth arising from simply lack of vigour on the part of the calf and the inability of the mother to properly nurse them. This shows up immediately in your live calves at heel, and there is a body of data missing in the evidence which so far has been brought forward, and that is the live births, live calves at heel. We know something about the pregnancy rates. The next part of the equation is live calves at heel. These are animals that have been born, have identified themselves with their mothers, have nursed for two or three days and are with the mother joining the herd. There is a loss -- quite a heavy loss between the mid-winter pregnancy rate and the live calves at heel. I have had a loss of as high as 50% in an elk herd in that intervening period between pregnancy rate in December and live calves at heel in June.

Then, there is a loss during the summer which is herd specific. The trouble is, most of these things are herd specific. That is why you get into trouble reasoning from one herd to the next.

THE COMMISSIONER: We are dealing with the Porcupine.

A I beg your pardon?

THE COMMISSIONER: We are dealing with the Porcupine herd.

A Yes, I am dealing with the Porcupine herd, though we don't have enough data on the Porcupine herd to answer all of these questions. It would be interesting then to know the loss during the first

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summer. Now, they have got some quite good data on this because they have got the July count, and then they have got another count later on in the autumn, but it is not as reliable as either they would like, I am sure, or I would like.

You then need to know the loss through the first winter, which they have got, because they have got good yearling counts, made by Calef and Jakimchuk and that whole research group. Now, the yearlings are the ones that have been put into the herd to replace the adults that have died in the meantime through all the things that animals die of, be it wolves or sickness or accident or starvation, all the things that animals die of, and I am going to have to add hunting as another element in this.

Now, the way that the herd looks to me now, in one year, the first year that Mr. Jakimchuk worked with the group, the input of yearlings was over 20% which was an extraordinarily good input, but subsequent years, the input that they have measured has varied between 6% and 9%. They estimate the annual kill from the herd, and here is another figure that would be very much more comfortable to have more accurately. The annual kill by people is not known accurately, and the annual kill by wolves is only guesstimated, and unless you know how the annual kill matches with the yearling input, you don't know whether the herd is increasing, or decreasing or at balance, and these kinds of data would be helpful to have, but I don't know that they would make too much difference in the choice

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1 between the coastal route and the interior route. I
2 think we are at the point that you finally resolved there
3 that these are legitimate differences of opinion of a
4 professional nature based on the same evidence.

5 THE COMMISSIONER: Could I
6 just ask one question and then I think we should adjourn.
7 I think that it must be after five now.

8 There was one difference of
9 opinion between Dr. Calef and Dr. Banfield that may be of
10 importance. The pipeline is to be constructed during the
11 winter, but the point has been made that there are
12 activities during the pre-construction period and during
13 the years of construction that occur in the summertime
14 as well, and we know from Mr. Jakimchuk that 10% to 15% of
15 the herd wintered on the coast the last two or three
16 years --

17 A Two years, yes.

18 Q Now, Dr. Banfield said
19 that the caribou calve in the foothills, not actually
20 on the coastal plain. Dr. Calef took strong exception
21 to that and said that they calve along the plain and in
22 the foothills and -- I am probably not quoting him
23 accurately, now, but I got the impression that all
24 along they both agreed it was not one spot, it was all
25 along the coast, a continuum that might extend for
26 hundreds of miles, but if Calef's view is sound, then
27 this calving activity occurs in proximity to the pipeline,
28 if Dr. Banfield's is sound, then they are in a sense
29 off to one side -- this is putting it pretty crudely, but
30 do you have any views on that? Do you feel that you could

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express an opinion in support of one or the other?

A No, I am sorry, sir, I don't, because this is the kind of view that should only be expressed by people who have been there and have done the field research. I haven't, so what I would be talking about is the data that Calef used and that Jakimchuk used. The Canadian Wildlife Service people have been there and Ian McEwen, was it back in '69, '67 -- it is in the evidence, found about 20,000 caribou wintering on the coast as long back ago as that.

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1 Close to the slope or at least they were there very
2 early in the new year when he was over there.

3 I am sorry but
4 I simply can't be more helpful on that.

5 THE COMMISSIONER: No, no, I just
6 while you are here I wanted to see if you had a view
7 about that.

8 Well, I think we will
9 adjourn until -- our hours are 9:30 until 12:30 and
10 then 2 until 5. I think those are the hours we will
11 be keeping this week and presumably, Mr. Scott, we
12 should be able this week to complete the cross-examination
13 of the Environment Protection Board and hear Mr. Anthony's
14 remaining witnesses and any of yours. Is that the
15 program for the week?

16 MP. SCOTT: I think that is
17 impossible of achievement. I think we'll be able to
18 complete Mr. Anthony's evidence. He has one additional
19 witness to lead in chief and perhaps one or two of our
20 witnesses.

21 THE COMMISSIONER: All right.
22 Well, 9:30 in the morning then.

23 (PROCEEDINGS ADJOURNED UNTIL JANUARY 13, 1976)
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347
M835
vol. 107

AUTHOR

12 Jan., '76, vol.

TITLE

Mackenzie Valley Pipeline Inquiry

DATE DUE

BORROWER'S NAME

347
M835
vol. 107

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Government
Publications

MACKENZIE VALLEY PIPELINE INQUIRY

IN THE MATTER OF THE APPLICATIONS BY EACH OF
(a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A
RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS
CROWN LANDS WITHIN THE YUKON TERRITORY AND
THE NORTHWEST TERRITORIES, and
(b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY
THAT MIGHT BE GRANTED ACROSS CROWN LANDS
WITHIN THE NORTHWEST TERRITORIES
FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE
and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND
ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION,
OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE
PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

January 13, 1976.

PROCEEDINGS AT INQUIRY

Volume 108

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E R R A T A

By N.J. Wilimovsky :

Volume 107, p. 16331, line 20.

"Solution literature" should read "pollution literature".

Volume 107, p. 16373, line 3.

"assistance" should read "subsistance"

Volume 107, p. 16381, line 7.

"in" should read "an"

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NE
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APPEARANCES:

Mr. Ian G. Scott, Q.C.,
Mr. Stephen T. Goudge,
Mr. Alick Ryder and
Mr. Ian Roland for Mackenzie Valley Pipeline
Inquiry;

Mr. Pierre Genest, Q.C.,
Mr. Jack Marshall, and
Mr. Darryl Carter for Canadian Arctic Gas
Pipeline Limited;
Mr. Reginald Gibbs, Q.C.,
Mr. Alan Hollingworth &
Mr. John W. Lutes, for Foothills Pipe Lines Ltd.;

Mr. Russell Anthony &
Pro. Alastair Lucas for Canadian Arctic Resources
Committee;

Mr. Glen W. Bell and
Mr. Gerry Sutton, for Northwest Territories
Indian Brotherhood, and
Metis Association of the
Northwest Territories;

Mr. John Bayly
or
Miss Leslie Lane for Inuit Tapirisat of Canada,
and The Committee for
Original Peoples Entitle-
ment;

Mr. Ron Veale and
Mr. Allen Lueck for The Council for the Yukon
Indians;

Mr. Carson H. Templeton, for Environment Protection
Board;

Mr. David Reesor for Northwest Territories
Association of Municipal-
ities;

Mr. Murray Sigler for Northwest Territories
Chamber of Commerce.

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WITNESSES FOR ENVIRONMENT PROTECTION BOARD:

Carson H. TEMPLETON

K.M. ADAM

Ian McTAGGART-COWAN

Norman J. WILIMOVSKY

Donald N. CRAIK

L.C. BLISS

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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

THE COMMISSIONER: The
hearing will come to order. My apologies for being late,
and my congratulations to Mr. Bayly, who was elected
president of the Yellowknife Bar yesterday.

(APPLAUSE)

MR. BAYLY: Thank you, sir.

CARSON H. TEMPLETON
K.M. ADAM
IAN McTAGGART-COWAN
NORMAN J. WILIMOVSKY
DONALD N. CRAIK
L.C. BLISS
ERIC GOURDEAU
STAN THOMSON, resumed:

CROSS-EXAMINATION BY MR. BAYLY (CONTINUED):

Q Dr. McTaggart-Cowan, when
we left off yesterday we had been discussing the fact
that experts using the same data or faced with the same
data gaps had come to different conclusions about which
season or seasons are most important to the caribou, and
you were in the midst of an explanation of the reasons
that this might be so, and I wonder if you could recap
that and I understand you have some further thoughts
which you'd like to present to us on that subject.

WITNESS McTAGGART-COWAN: Yes,
Mr. Bayly. Yourself and the judge raised the question
of how it was that one could come up with different
judgments, and how those who had to make the decisions
can resolve these differences of opinion. One of the
matters that we addressed ourselves to yesterday was

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1 the argument of whether the impact of disturbance on
2 the winter range was more or less important than dis-
3 turbance on the calving range and on the summer range.
4 This argument is, at least the basis of settling this
5 argument is deficient in terms of hard scientific data.
6 The data that I reported on yesterday indicates that
7 the animals are more responsive to disturbance on the
8 calving grounds during the period when they're being
9 disturbed by bot flies and warble flies in the summer.
10 Thus my advice that I regarded the calving grounds in
11 summer as more important.
12

13 There are no data yet covering
14 the immediate or the long-term consequences which could
15 be revealed in birth rates, in mortality rates on the
16 two areas. The real issue is that the caribou should
17 not be disturbed wherever they are because it will have
18 an impact on them, and they live in an annual cycle in
19 which their energy is put together in important ways.

20 Then, too, the circumstances
21 that occur at the time of the disturbance will be
22 important in the result. For instance, disturbance late
23 in a very severe winter on the wintering ground will be
24 more important than disturbance at the end of a very
25 mild winter when the animals have not been under nutri-
26 tional stress.

27 There were one or two other
28 points that, in thinking back over our discussions yester-
29 day, I wish to clarify. I don't think I made it quite
30 clear that the base line I was using when I was talking

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about the increase in energy expenditure of an animal that was being disturbed to the point of exerting itself up to its maximum. The base line I was using was resting metabolic rate, which is different from basal metabolic rate by being twice as large roughly. Thus when I said that the animals would be expending energy up to six or ten times their resting rate, this would be the equivalent of approximately 12 to 20 times the basal rate. Now the difference is very technical and maybe of no particular interest to those here, but it is an important one to the biochemist.

I wasn't sure that I made it clear that the consequences of harassment on caribou and on other animals can be extremely varied. I drew my example from harassment on the winter range that could result in the exhaustion of the animal's energy reserves, giving rise to death of animals that would otherwise survive, to the birth of undersized calves and so on.

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It can however lead to many other consequences such as accidents in steep and rocky country giving rise to broken legs and so on. In the summer it can give rise to separation of mother and calf. It can give rise to acute exhaustion with collapse as has been reported by Zhigunov in Russian reindeer. Indeed, Zhigunov specifies that working reindeer require very frequent rests and the access to high energy supplemental foods, which of course are not available to wild reindeer, which is the same thing as wild caribou.

Another Russian, Dr. Bannikoff who has done a lot of work in reindeer, records damaged lungs in Saiga antelope as a result of being run and also collapse and death after chases by automated vehicles, which again refers back to my concern over the use of snow sleds in hunting. I could detail more, but I think that this is adequate to make it certain that everyone understands that the consequences can be broad.

You, sir, asked me whether I thought that the applicant's data on harassment were adequate to justify their conclusions. I don't think that I answered that very directly. In reviewing the recommendations made by CAGSL I find one important point which I don't think the data are adequately reflected in the recommendations. This is in respect to the minimum altitude in which overflight of caribou herds would be tolerable. The CAGSL recommendations say a thousand feet. The E.P.B. recommendations say two thousand feet.

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The difference reflects our interpretation of the maximum refinement available from the existing data. In other words, if your experimental evidence has been obtained in a broad brush way, then you can't cut your specifications too fine. I did make it clear yesterday that I thought that the tests that had been done so far had been a logical beginning, but that they were broad brush. There is no doubt that the data could have been taken with greater precision and that had it been taken with greater precision, more refined conclusions would have been possible. I think I made it clear that the design of experiments in the area of animal behaviour and energetics is a highly specialized task and had the experiments been laid out by a specialist, the manner of their attack, I am sure, would have been somewhat different.

Now, we still need these better data to firm up our conclusions, and I think these data on the consequences of overflight of caribou would be important short of doing the more sophisticated electronic data gathering which I referred to yesterday. But I would urge that if additional overflight experiments are to be done, that the design of the research is very carefully drawn up, and done with due concern for the impact of the research itself on the caribou, as this kind of research does impose disturbance on your experimental subjects.

Mr. Commissioner, you asked me yesterday whether there was any way of resolving this question of where caribou calve. You said that you had

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two bits of evidence on this. I haven't been able to identify the point at which, in the evidence, at which CAGSL's biologists made the statement that they calved on the upper slopes.

THE COMMISSIONER: That was Dr. Banfield, really, who said it here in response to a question I think that I put to him.

A The point is that I am not quite sure how specific he was. Was it an implication that that they calved on the upper slopes only?

THE COMMISSIONER: Well, the way he put it was that they calved in and about the foothills and there were not many of them to be found calving on the tundra, on the slope, extending from the foothills to the sea.

A Well, that may well be the basis of the resolution, because Dr. Calef's observations made on the area by himself definitely show that they use the lower slopes also, so that the real question then becomes what proportion of the herd is using the lower slopes versus the upper slopes, under what conditions, and how frequently those conditions occur. It is resolvable if the issue is a very important one. It may well be. In fact, I think that it is.

I think that that is all I have to say in clarification of what I was talking about yesterday.

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MR. BAYLY:

Q With regard to the difficulties in resolving the judgments of the experts on the data, you've referred to the fact that there are some areas where more data would assist, but the conclusions maybe ones that are valid to reach differently given that the data is the same.

A Given that the data is the same, I think the conclusions are valid to reach, with the exception that I made, on the height of overflight. I think the data indicate that there is still up to 18% of the herd in a state which we would regard as unacceptably disturbed with overflights of 1,000 feet, under some circumstances.

Q And you had referred to a specific area where you were concerned that there might not be enough data collected yet, and that was the statistics that showed the number of calves at heel after birth, and I believe there's another area that you didn't cover in detail yesterday, and that's the question of predation by in particular wolves, and the fact that there may not be sufficient statistics to even let us know what numerical effect that has on the herds from year to year.

A Yes, that was the gist of my expressed concern. In fact the entire field of the statistics of the herd is so far inadequately represented it would be impossible to draw up an adequate input-output formula for the herd at the moment, on the basis of the data available.

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1
2 The question of the role of
3 predation is an extremely difficult one to get at. I
4 know only too well from the experience that one of my
5 graduate students and I have been having in Mount
6 McKinley Park where it's taken us seven years of concen-
7 trated work on one area to come up with the total or at
8 least a reasonable approximation of the input-output
9 data on a herd. But we don't have an adequate indi-
10 cation of the role of predation, nor do we have adequate
11 data on the kill by humans and what these mean.

12 Q Do we have data that would
13 let us even hypothesize as to whether the herd is at a
14 peak or a low level or in an area of decline or increase?

15 A I think I would agree
16 with Dr. Calef, and I think also with Mr. Jakimchuk and
17 Dr. Banfield that the herd shows some signs of being on
18 a slow increase or approximately stable. It's very
19 close to that point and when it's changing just one or
20 two percentages a year it's very difficult to detect
21 and nobody can default it for not detecting it.

22 Q Now I just have one other
23 question, and that is to Mr. Templeton. We had discussed
24 yesterday some of the assumptions made by the Environment
25 Protection Board and I invite you to agree with me that
26 those assumed that the only two routes for consideration
27 were the prime route and the interior alternate, and
28 you did not assume, for example, that the delta was going
29 to be crossed and therefore we had no environmental
30 impact assessment by you of the cross-delta proposal.

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Cross-Exam by Bell

WITNESS TEMPLETON: That is correct.

Q And the same with the Fort Simpson realignment.

A That is correct.

Q These came about after you had done your work so that they weren't even in the mix when you were looking at the proposals?

A Yes.

MR. BAYLY: Those are all the questions I have, thank you.

CROSS-EXAMINATION BY MR. BELL:

Q Mr. Gourdeau, do you have a copy of Volume 47 of the transcript? I intend to make several references to it.

WITNESS GOURDEAU: Yes, I do.

Q I refer you, sir, to page 6240 of the transcript.

A 6248?

Q 6240.

A 40?

Q 40, four 0, yes, and in the first paragraph of your testimony you mention the data that you rely on for harvesting of game and other resources, other game and fish in the Northwest Territories, and I take it that the source that you relied on is the publication of the Environmental Social Program called "The Regional Impact of a Northern Gas

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Pipeline, Volume 5."

A Yes

Q And that the sources for that report are data kept by the Northwest Territories Government on general hunting licences and a survey carried out by the Northwest Territories Government.

A Yes.

Q I understand that it's possible that these data do not reflect the true extent of hunting, fishing and trapping activities in the area concerned.

A This is my impression also, that these are very minimal figures. It surely in my mind does not present them by far the real capture probably that have been done during these years.

Q And it's probably impossible to know by how much they are under-stated.

A No, it would be quite difficult, but I think it's almost impossible, at least it was for me because this would have meant real research into that, and you would have to really get the real figures from the harvesters themselves and fishermen and everything, so this must be very difficult because it has never been made so far, and -- but for me it was not that important to have the right figures for my report. What was important was to see if just taking what is absolutely sure, even if it is quite minimal, the use of the resources by the native people was significant or not, and if any trend could be revealed by

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1
2 the existing statistics, could show that the people
3 were less interested or more interested or equally
4 interested in the harvesting of resources.
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Q So, you would say then
that these data are probably understated to a significant
degree?

A For me, yes, oh, yes. I
think so.

Q I would like to now refer
you to page 6242 of the transcript at line fourteen of
that page where you say:

"In the area to be traversed by the proposed
pipeline, the proportion of native people
depending on their harvesting activities
to survive and generally their degree of
dependence have both decreased."

And I take it that this is due to population increase
and to new needs brought into the north from the south?

A And what was the second
reason?

Q New needs brought into the
north from the south. I think that is what you say
in your evidence.

A New needs and new standards
and new models, yes, that the people are trying to
follow that are important to the north, and yes --

Q But this isn't an absolute
decrease relative to previous years?

A This is an absolute --

Q It is not an absolute
decrease in activities.

A No, no. No, no, not at
all. It is only a proportion and it is the degree of

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importance in their livelihood, but it is not an absolute, no.

Q Later on in your testimony you talk about the James Bay project, the James Bay hydro project and I would like to ask you this question, sir. Would you say that the commencement of the James Bay hydro project prior to the settlement of native claims in Quebec acted to prejudice the interests of the Quebec natives in the settlement that was achieved?

A Yes, I think -- you are asking me if the commencement of the work before any settlement was reached prejudiced the native people, is that your question?

Q Yes.

A Yes, definitely because for me what is a prejudice to the people is what prevents them from playing an active role in their own evolution and in the society, and the fact that they were treated as if they did not exist, the fact that they were treated as though they were ignored, and their rights were, in the eyes of the government, non-existent, could not but give them the opinion that they had no right really to play a role in their own evolution by themselves. They had just continued to be disposed of and to be told what they should do. So, for me, I think that it was a golden opportunity that was missed, really at this time for the government and for the society in general to recognize that they had special rights, and I think -- I am convinced that if this had been done they would have felt proud, they would have felt more equal to the

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other Canadians and from that time on they could really have been more interested to participate in the development of their own population and to participate in the society in general.

Q Would you say, sir, that the interests of natives in the Northwest Territories are likely to be prejudiced if permission to build the proposed pipeline is given prior to a land claims settlement?

A I think that if a permit to build the pipeline, because this is the big enterprise that is under question now, if a permit would be given without previous recognition to their rights and previous settlement of their rights to the satisfaction would necessarily provoke a negative reaction on their part and would seriously hamper the possibilities for them to evolve as they should in our society.

THE COMMISSIONER: Mr. Gourdeau, you were Director General of New Quebec, were you?

A Yes.

THE COMMISSIONER: And is that something like being Commissioner of the Northwest Territories?

A Yes.

THE COMMISSIONER: It is a comparable sort of thing?

A Yes, sure.

MR. BELL: Those are all the questions that I have, sir.

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THE COMMISSIONER: In that capacity you reported to one of the ministers in the government of the province, I take it?

A Yes.

But it was a special thing. The way it was set up it was a general branch, the general branch of New Quebec, but by order-in-council, all the responsibilities, the provincial jurisdiction were transferred from all the other departments to that branch --

THE COMMISSIONER: Oh, I see --

A -- and not to the department in which I was, but to the branch itself, except justice and forest, but there was no forest, anyway.

THE COMMISSIONER: But there was justice.

CROSS-EXAMINATION BY MR. VEALE:

Q Dr. McTaggart-Cowan, in your evidence in June I understand that you agreed that the absence of significant human activity in the northern Yukon is why we still have the Porcupine caribou herd there.

WITNESS MCTAGGART-COWAN: I think that that is a fair statement.

Q And as far as mammals are concerned, the pipeline could be built up the Mackenzie Valley with far less potential impact than across the northern Yukon irrespective of the route across the northern Yukon?

A That is still my view.

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Q And as a result of those
two views that leads you to your preference for the
Fairbanks corridor?

A Yes, that is right, sir.

Q Now, you have also stated
that as a worst case example, that if no regulations
were adopted or if the regulations were inadequately
or poorly enforced, the Porcupine caribou herd could be
seriously depleted between five and ten years?

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1
2 A Yes,
3 that was my testimony.

4 Q And the five and ten
5 years, is that a guestimate by you, or is that --

6 A That's a guestimate. I
7 think perhaps I would extend it a little further.
8 The herd is a big one and the impacts would not come in
9 a hurry, I don't think they would come in a hurry, and
10 I would probably extend that beyond five or ten years.
11 Again, I was just guessing that it would be from ten
12 on. Most of the herds that have collapsed under human
13 pressure have taken quite a substantial number of years
14 to do it. I've been looking again at the literature
15 on that, and some of them persisted up to 25 years,
16 slowing drawing down.

17 The collapse is apt to be
18 precipitate when it happens. In other words, a herd that
19 is decreasing can go down very slowly, almost undetect-
20 ably at first, and I think the increase is in the same
21 way. It can increase very slowly at first, then all of
22 a sudden it gets over a barrier and away it goes, and
23 I think the same thing happens on the draw-down, looking
24 at the evidence of other caribou herds that have collapsed.

25 Q So --

26 A And again the data are
27 very rough because people weren't watching them with the
28 precision that we wished to goodness they had been watch-
29 ing them at that time.

30 Q -- and even if you are

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1
2 watching with precision, I presume it is difficult to
3 discern the trend.

4 A Early in the game it is.

5 Q And that's why you would
6 say -- would you say 10 to 15 years rather than five
7 to ten years, is that the position you've taken?

8 A Yes.

9 Q Now you've also stated
10 that although the research effort has been massive,
11 that it's predictive value is regretablely low and that
12 there still is not enough backup data?

13 A Yes.

14 Q Now you mentioned certain
15 areas with Mr. Bayly, and one of these is that they're
16 all single specie studies and they haven't really been
17 integrated.

18 A Yes.

19 Q And I presume another
20 area would be the fact that there hasn't been any test
21 of the hypothesis about the flies on the coast. In
22 other words, no one has actually gone out and studied
23 to establish the fact that the abundance of flies on
24 the coast is more than it would be on the interior.

25 A I think that's an accurate
26 statement, though I think the experience of those who
27 have been working on the coast could give you a broader
28 brush impression as to whether they are or not.

29 Q Now you've also stated
30 too that --

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1
2 A Perhaps I could amend that.
3 There is one fact that is well-documented. That is
4 the date of emergence of mosquitoes in numbers, I think,
5 could be documented, and that the point has been made
6 by the biologists working on caribou that one of the
7 advantages they gained by being on the North Coast is
8 that they escape the early emergence of the mosquitoes
9 and they get a head start in giving birth to their
10 calves without the mosquito harassment and giving the
11 calves time to grow until they're larger before the
12 mosquitoes become very severe.

13 Q Well, you would still
14 agree that it hasn't been studied to the extent that
15 we don't know about the mosquito population in the
16 interior, whether or not it may be just as acute, but
17 the fact of migration may be preventing the same
18 harassment.

19 A That is true.

20 Q Now you also stated in
21 June that a buried gas pipeline may have little effect
22 on the Porcupine caribou herd, but that no one could
23 be certain of that.

24 A Yes, I think that's a
25 fair statement, but I still maintain that a buried
26 cold gas pipeline which has the vegetation restored
27 on it in my judgment is likely to have minimal effect
28 on impeding the migrations of caribou.

29 Q Now with respect to your
30 last statement that you've also stated that a road of

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any kind along which vehicles are passing at frequent intervals is almost impassible by herds of caribou and such disturbance could prevent or delay the movement of pregnant cows to their traditional calving grounds, possibly forcing them to calve in areas which are traditionally unsuitable, resulting in higher calf loss and so on.

A Yes, I think the barrier effect of the road is documented. The consequences are a matter of judgment.

Q Well, my point, doctor, is that to the extent that the interior route involves a greater use of the Dempster Highway for delivery of materials, and also involves the -- well, I thought there were three but you indicated four access routes from the Dempster to the interior route itself.

A M-hm.

Q To that extent, there is a great risk that unless mitigative measures are adequately enforced there could be serious problems in interference with the migration.

A I think that's a fair statement, yes.

Q And I believe in your evidence yesterday you indicated that that was one of the issues that went counter to your preference for the interior route.

A Yes sir.

Q The other difficulty with

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those roads is that there is the possibility of dividing the winter range that exists as a result of repeated disturbance, and in consequence driving the caribou from a significant portion of their winter range.

A Yes. I gather that the migration route intercepts the highway all the way from Mile 69 to about Mile, I think it's 289, I maybe out on my mileages a little bit. It's in the order of a 200 mile front, the herd --

Q That's correct.

A -- traditionally has crossed that road.

Q Right, and you have stated also that it's a truism that -- that is your word -- that the animals don't go somewhere else.

A Yes.

Q So that if there is a loss of a winter range, that is an absolute loss to the herd if it's at its maximum capacity.

A That is right. Your final statement is the important caveat, "if it's at its maximum capacity".

Q So then taking all these things into consideration, you still have a preference if you had to make a choice for the interior route, but your statement is clear that it is the lesser of two evils.

A That's what I said yesterday.

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Q I've always referred to them as "the evil routes", but I don't think that would be proper. Now, to pursue this further in your preference between the routes, there were ten factors that you chose and you took each one of those factors and you resulted -- I think the result was that three of the items, the sheep, the grizzly and the fur-bearers, were of equal difference. You made no choice between the routes. One of the items, fisheries, you indicated a preference for the prime route.

A I deferred to Dr. Wilimovsky's view.

Q Correct.

A Yes.

Q So then we have the remaining six which dictate your marginal preference for the interior route over the prime route. Now, in dealing specifically with your comments yesterday --

THE COMMISSIONER: Excuse me, Mr. Veale, did Dr. McTaggart-Cowan, speaking for the Board, say that the preference for the interior route over the prime route was a marginal preference? Did that --

A I didn't say "marginal", no sir.

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MR. VEALE: That was my word.

THE COMMISSIONER: Bear in
mind, Mr. Veale wants to keep it on the coast if he has
to put up with at all. That's why these expressions
are snuck in there.

A Thank you for drawing my
attention to the innuendos.

MR. VEALE: That is surely
unfair, Mr. Commissioner, to indicate what is widely
known.

THE COMMISSIONER: Incidentally,
I think that I had twelve, not ten factors which I
innumrated.

MR. VEALE: Maybe the transcript
didn't pick up two, but I counted ten.

Q You don't agree then
that it is a marginal preference ?

A No.

Q At page -- well, it is 16294
of yesterday's transcript, I will just quote to you your
conclusion that your analysis of the caribou factor
led you to and you said:

"This analysis of evidence leads me to conclude
that 1) the completed pipeline along the Interior
Route is unlikely to deter caribou from their
migratory movements." I emphasize the completed
one, your words.

"and 2) that the Prime Route will expose the
caribou to the potential for disturbance

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during its most sensitive periods. That could lead to increased calf losses and these are already high."

Now, from reading that I have drawn the conclusion that you emphasize the completed route.

A That is right.

Q Now, particularly with respect to the Interior Route, do you also place the same emphasis on the Prime Route, in other words, is it the completed pipeline that you are speaking about?

A Yes.

Q Well, my question is, what is the difference between those two routes when you talk about the completed line? When they are both completed they are both buried.

A Right.

Q And where then do you say, well, the Prime Route involves so much more interference or potential interference with the calving ground?

A My concern there arises in part from one of the other elements that I introduced, and that is the number of days that it seemed to me that the altitudes of overflight could be met along the North Coast, this is one of the concerns versus the Interior. Now, again, I don't have the data. I am sure that they are available if one looked -- no, I am not so certain that they are available, but it is the general impression of those who have been along the North Coast that I have

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talked to that there is more fog, more low cloud on the north coast. The overall corridor within which the animals are confined in moving along the north coast early is in my understanding narrower, so that those are among the reasons which I used to reach that decision.

Q So then you are making your decision on the caribou factor based on flights over the completed line?

A In part, yes.

Q Well, in all, because the lines aren't any different when they are completed, they are buried.

A The lines will be buried when they are completed, you are right.

Q So that your preference is based on the fact that you feel that there will be more overflights?

A No. No, because I accept the applicant's statement that the number of overflights per month will be approximately the same, but it is a question of how frequently you have to inspect the pipeline. The only differences that I could see would be, that would arise whereas the integrity of the pipeline had different threats on the north coast than in the Interior and I don't know that. It hasn't been part of the statement.

Q Well, I may be labouring this, but will you take the position of two completed pipelines and where does your preference arise then

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between the routes, just based on the --

A So far as caribou are concerned only, my concern is that the surveillance of the pipeline would be likely to cause more disturbance to the caribou on the coastal route than on the Interior route.

Q And yet the caribou as far as the coastal route are concerned, are only there for, in their highly sensitive time, are only there for approximately one month, or one month and a half, is that right?

A No, they are there from May on into August, are they not?

Q Well, surely they're --

A And according to McEwen and according to the statistics that have been put in evidence by the CAGSL group there are a substantial number of them. I think in the last two years in the order of 10% of the herd has been on the north coast in the wintertime.

Q So your preference then comes down to the fact that the herd will tend to be stationary there or moving across that coast as opposed to the Interior Route where they will be crossing in their migration and hence they will be there for a shorter period of time.

A They will be in contact with the pipeline for a shorter period of time in the Interior route.

Q Now, moving on to the

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1 terrain factor. You have talked about the terrain of the
2 Interior Route being a small part of a very large biome --

3 A Yes.

4 Q -- and the coastal route
5 being a relatively unique biome and that is the basis for
6 your preference for the Interior.

7 A Yes.

8 Q Now, it strikes me that
9 from a terrain analysis one could just as easily take
10 the position that the Interior Route crosses a number
11 of mountain ranges which the coastal route does not,
12 thereby created obvious construction difficulties and
13 whenever they get on slopes, the potential impact on the
14 environment could be greater and also taking the position
15 that the Canning River area is an area where because of
16 terrain, there is almost ^{no} latitude and they just go down
17 that one valley and that is it, that the potential
18 impact there on mammals is going to be considerable, I
19 would have drawn the other conclusion on that particular
20 terrain matter.

21 Do you agree with that, or do
22 you ?

23 A No, I am afraid that I
24 don't. I disagree. The fauna is the basis that I am
25 using to indicate the replaceability or replicability
26 of the biome and there is nowhere else in the northern
27 part of mainland Canada where the fauna of the coastal
28 plain can be found. Whereas, the fauna of the Interior
29 Route area has a fairly wide distribution, that is really
30 the basis of the decision.

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1 Q Doctor, when you talk
2 about the fauna are you talking about the birds?

3 A I am including both
4 birds and mammals.

5 Q Birds and mammals.

6 A Though the edge is larger
7 with the birds because the mammals, the grizzlies occur
8 on both, the mountain sheep does not occur on the coast,
9 it does in the Interior, the caribou occurs on both,
10 the Arctic fox occurs on the coast much more than on the
11 Interior, though a few may stray in and so on, you can
12 go down the line --

13 Q Because in giving the
14 edge to birds, it strikes me then that you are getting
15 back to a factor that we have already considered and
16 established the preference of the Interior over the
17 coast. In other words, I am saying that we are looking
18 at terrain and you have introduced to your terrain
19 analysis the fauna. You isolate the terrain.

20 A I am afraid that I am
21 unable to isolate the terrain from the things that
22 live on it.

23 Q Well, then, that is fair
24 enough, except that that terrain as a factor no longer
25 becomes a unique factor, one of your ten. You are
26 just, I mean, you can add the terrain into the bird
27 factor.

28 A It is also unique, I think,
29 as a landscape.

30 Q Well, both of them are,

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aren't they? I mean --

A I suppose that you could say that every valley is unique if you wanted to go that far, yes.

Q All right. Okay, we'll move on to the Wilderness Range as another consideration and the Alaskan witnesses, and I don't wish to be incorrect in summarizing what they stated, but my feeling was that they were taking the position that even though the Interior Route goes along the edge or skirts political boundaries of the Wilderness Range, they felt that that was a very minor advantage on the scale of things because the fact was that it would open access to a previously undisturbed area --

A Yes.

Q -- and have the same drawback as the Prime Route.

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1
2 A That's
3 not my reading of their evidence.

4 THE COMMISSIONER: Would you
5 mind repeating that?

6 MR. VEALE: Well, I think, Mr.
7 Commissioner, when the Alaskans were asked about how
8 they felt about the two routes --

9 THE COMMISSIONER: You mean
10 Parker and Weedon.

11 MR. VEALE: Yes, that their
12 indication was that they wished neither of the routes
13 because of the fact that even the interior route opened
14 up that hitherto untouched area, and that was the
15 inviolate principle.

16 THE COMMISSIONER: I think that's
17 fair enough.

18 A yes, I think that's fair.
19 That is my reading, your second statement.

20 MR. VEALE: Q Right, and all
21 I'm saying then is taking the Wilderness Range issue
22 you don't get a preference from it.

23 A Oh yes, because the
24 -- one way you're opening access; in another way you're
25 violating your situation. I think Dr. Weedon made this
26 point that once you're inside the boundaries per se,
27 you've violated the principle of the inviolability of the
28 boundaries so not only have you intruded access but
29 you've also intruded the principle that you can violate
30 the boundaries for industrial purposes.

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1
2 Q But surely the boundary
3 -- the boundary is a political boundary, it's a boundary
4 that had to be drawn but it's not a boundary that
5 exists in the natural state of things, so that
6 any violation of the area is a violation of the boundary,
7 surely.

8 A Any violation of the area
9 is a violation of the biome, but political boundaries in
10 protected areas have a reality. You're arrested when
11 you cross the boundary of a National Park with a loaded
12 unsealed firearm. You aren't arrested if you're two
13 inches outside of it; it has a reality.

14 Q Yes, it does. Now
15 moving onto the point of the factor of future discover-
16 ies, this is the point where you get into the area of
17 what you call "gamble".

18 A Right.

19 Q You are taking a gamble,
20 I think I've got your evidence correctly, to say that
21 there will be a small or an area of the North Coast
22 which will if you're gamble is correct, remain untouched.

23 A Yes sir.

24 Q Now let's talk about
25 boundaries. Where is this area?

26 A I don't know.

27 Q What's your gamble? What
28 do you think it's going to be, from the Firth River to
29 the Babbage River, or from the Firth River over to the
30 N.W.T. border?

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1
2 A I'm afraid I couldn't put
3 boundaries on it. If I was to put boundaries on it I
4 would be using data with which I'm not familiar, and I
5 don't think -- I frankly don't think that the geologists
6 have come up with the boundaries.

7 THE COMMISSIONER: I think the
8 discoveries, we'll find this out next week and the week
9 after presumably when we hear the evidence of the people
10 from Gulf, Shell, and Imperial; but my impression was
11 the tendency was for the discoveries to be rather more
12 over toward the Tuktoyaktuk Peninsula rather than moving
13 westward. That's about all we can say, if that.

14 A Well, I think that the
15 existing discoveries are in that direction. The sedi-
16 mentary basins, or the basins in which the geologists
17 claim it is useful to explore, as I recall, extend over
18 almost to Herschel Island from the Mackenzie Basin, and
19 I'm not so secure in my memory if the boundaries extend
20 eastward from Prudhoe. I think this point was also made
21 by Weedon, as I remember.

22 Q M-hm. Well, the difficulty
23 that I have with your gamble on the discoveries issue
24 is that there are other factors, and we've -- material
25 has been presented, or at least counsel have seen it
26 here, relating to the location of a sea terminal and
27 you're probably aware of this, and they've selected as
28 the best site the Babbage Bight, and that may also be the
29 site of a possible L.N.G. plant too, and my fear is that
30 the North Coast is going to have that kind of intrusion

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1
2 in any event, and preferring the interior route to me
3 leads to a greater gamble that will have a gas pipeline
4 on the interior and will have gas pipelines on the
5 coast.

6 A We're comparing gambles
7 now, aren't we? Your gamble and my gamble. Have you
8 intruded into -- I'm not supposed to be asking you
9 questions, I know -- but would you like to include in
10 your question to me whether I'm concerned about the
11 potential for the discoveries on the Marsh Fork of the
12 Canning and on the Eagle Plains, which are adjacent to
13 the interior route?

14 Q Well, we know that those
15 have a far lesser potential than the Beaufort Sea be-
16 cause they've been placed down the list. The Beaufort
17 Sea is the No. 1 area, and that evidence is before
18 this Inquiry.

19 A M-hm.

20 Q And we know the difficul-
21 ties with Eagle Hains.

22 A Yes. We don't know too
23 much yet about the Marsh Fork, do we? The question of
24 the placement of anything on the coast would have to be
25 subject to environmental study, engineering study, and
26 political decision, in my view, and in this I think I
27 share the view of Dr. Weedon, the placement of a pipeline
28 along the North Coast now would be one step further
29 in making it a logical choice to put other things there.
30 I'm concerned with this additive effect, that once you've

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made a choice you've then added one more logical reason for taking the next step, what I referred to as destruction by insignificant increment.

THE COMMISSIONER: Well, bear in mind both of you that that is precisely what the pipeline guidelines contemplate. The pipeline guidelines say the Federal Government is willing to receive applications to build a pipeline along a corridor across the North Slope and the whole assumption is that that corridor will include the pipeline proposed to be built now and an oil pipeline in due course. Those are the assumptions built right into the pipeline guidelines and those are incorporated in the terms of reference of this Inquiry. We must go on the basis that the Federal Government in examining these potential corridors is looking at them as passageways not only for gas pipelines but for oil pipelines as well. The logic of that is explained in the guidelines. So that gives added force to your point, Dr. McTaggart-Cowan.

A It's been very uppermost in the back of my mind all the time as I looked at these considerations, that it's impossible to look at the gas pipeline alone with that kind of instruction hanging over our heads.

MR. VEALE: Q And I take it this is why the approval or whatever of the Environmental Protection Board is related solely to the gas line and is not related to looping. In other words, to the extent that Mr. Horte is going to loop that line, and has

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1
2 stated it as his policy --

3 A No, our approval is based
4 only on the fact that we have not been able to study the
5 other additional items that have been put into this
6 operation since last year.

7 THE COMMISSIONER: Excuse me,
8 Mr. Veale, I lost you again. What's this point now
9 that you're making?

10 MR. VEALE: Well, the point that
11 I was making was the studies of the Environmental Protec-
12 tion Board relate to the gas line per se without the
13 issue of looping. In other words, if the issue of
14 looping is thrown in, that is something that is -- that
15 you are not prepared to approve at this time.

16 A That is right.

17 Q Now, the Commissioner
18 was talking about the oil line following the gas line
19 and that was another one of your considerations indicat-
20 ing a preference for the interior, and --
21
22
23
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A Did I indicate that as a basis?

THE COMMISSIONER: I think that you said that the Board was opposed to an oil pipeline along either route.

A That is what I said and I thought that that was all I said about the oil pipeline.

MR. VEALE: You went on. You went on and you stated that a pipeline on either route is unacceptable, an oil pipeline, and then you stated that returning to your personal preference ^{if} you had to make a choice it would be the Interior Route largely because the potential for spills in your view could be more quickly handled in the Interior Route than on the Coastal Route.

A Yes, you are right. I remember that.

Q Speaking from a watershed point of view, I would put to you that the exact opposite might be true because the danger on the Interior Route is that you are dealing with the Porcupine, Yukon watershed and anything that goes in, goes into that entire watershed and the international salmon run and so on, so that on the Coastal Route you are dealing with a number of independent rivers, albeit that they all go to the Beaufort Sea, but could not the possibility of containment be better on the Coastal Route because if a spill occurred, say, at one of those rivers, it's not tied into the system to the same extent that the watershed in the Interior is?

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A Your question is an interesting one. I think that one could reason that way.

THE COMMISSIONER: That is the way that Steigenberger reasoned it.

A I have much the same feeling here as I expressed earlier. It would be a disaster, an oil spill -- at least it could be a disaster in the Porcupine, Yukon drainage, but if the company's contingency plans are adequate, hopefully it would be possible to get a boom in front of it and to begin clean up before it had gone too far down river. If it goes a long down river it is simply because the company is unable or unwilling to respond, it hasn't got its contingency measures properly in hand.

Along the coast, as the migration moves either eastward or westward, but particularly eastward migration in the spring, there are hundreds of thousands of migrating shore birds and water birds following the coast. The belugas follow the open water leads, be they against the coast or further out. The bowhead whales follow the leads. A lot of the seals start to concentrate in the leads, and the introduction of oil as a spill would have, in my view, very serious potential impacts on the vertebrate faunas and I think also the invertebrate faunas, although I have got very little evidence to support this, this is just a gut feeling on the business along the coast and this is what leads me to that judgment.

But I recognize the gamble, and

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as I say it is a choice between two evils.

Q Doctor, I will read another quote to you. You were talking about game management and information. You stated that the Yukon Territory -- before I get into that, perhaps, just to tie up this ten factors. You did not at any time consider social impact?

A No.

Q Now, the quote is that "the Yukon Territory is not equipped with the basic management information, the staff to obtain this information, or to translate it into data which will be necessary for essential management regulations. If the approval is given to build the pipeline, it should be recognized that greatly increased research and management staff will be necessary if good wilderness wildlife areas of the northern Yukon are to remain in anything like the condition they now are."

Now, the first question that I was going to ask is one that we have already dealt with and that is how long does it take to determine significant deterioration or decline, and you have read the evidence, I think, of Mr. Jakimchuk --

A Yes.

Q -- and I think he said three years, if I am correct, that he could detect the deterioration or decline in that short a time period and you now, in the face of that evidence are stating ten to fifteen years would be more appropriate.

A It depends on a lot of

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factors. It depends whether the stock is growing up or down and it depends upon the rate at which it is changing. If it is changing 1% a year I defy anybody to detect it in three years or five years because of the vagaries in the system. If you have got a system that is fluctuating widely in its input and the evidence that Dr. Banfield, Mr. Jakimchuk gave, as I recall it, showed an input of yearlings one year as high as 20 ^{point} something % and other ^{years} down, I think it was as low as 6%, 9%, this kind of thing. When you have got that kind of fluctuation, as the background perturbations of the system, it is very difficult to detect a downward trend at a slow rate, so that I would say that if it was declining very rapidly, or increasing very rapidly, you could detect it and I think that it would be easier to detect an increase than a decrease.

Q So that basically you are saying that if there is a significant deterioration immediately, well, that is fine, you would be able to pick it up, but if it is one of the slow declines which is the more usual type of decline, from your experience in game management, it would take a number of years to detect it?

A I am not sure that it is a more usual kind in the north.

Q I thought that was your evidence just recently, wasn't it?

A No. You can get both kinds of collapse.

Q So then, you would agree

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with Mr. Jakimchuk, that you would qualify it, then?

A I would agree that under certain circumstances, he could probably do it in three years. But I don't think that either he or I would guarantee that he could.

Q Well, when you talk about adequate monitoring, and with respect to the Porcupine caribou herd, can you tell us what we are talking about in terms of number of staff ?

A No, I couldn't. You'd have to sit down with a total problem in front of you and work this through. It would be impertinent of me to try to do it here.

Q So that you can't give us any idea of the costs that we are looking at at all, not even ballpark?

A No, I can't.

Q Is it the type of cost that there is going to be some reluctance of the government to fund? In other words, are you aware of the fact that, you know, the major money has been spent by the applicant. It hasn't been spent by government.

A Well, I am well aware of that. There has been a really major input by the applicant and the data base that have been gathered has been substantial, but gathering the data for a planning system, for a management system, depends in part upon the rate at which the use is taking place. If your rate of human use is relatively minor, then you can use a relatively coarse instrument to achieve the data, but

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the closer that your rate of human use gets to the tolerable limits of the herd to produce, the more refined your statistical data has to be.

Q So our data to date has been coarse, is that --

A Yes.

Q Do you think it reasonable that if the data is going to have to become more refined and sophisticated because we are going to have increased access if either of the routes is ultimately built upon, do you think that costs should be borne by the applicant, Arctic Gas?

A I don't know if that is a relevant question for me to answer. I can answer it on a personal basis.

Q Well, your Board has taken the position that 1% of the capital costs should be used as a surety bond.

A Yes.

Q And this is not too different, really, than that.

A Oh, I think it is poles apart. In one instance you are asking, as I gather, if there are damage that accrue as a result of the introduction of the pipeline, whose cost is it? Well, I think if they can be focused upon, if the damages can be related to mistakes that were made, or departures from stipulations, that they clearly reside with the constructor. But in my own view, if society takes a decision that it is in society's interest to undertake a certain kind of

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1 development, and that this has secondary influences on
2 other resources, it is society's responsibility to manage
3 the other resources effectively. Have I answered your
4 question?

5 Q Well, yes, perhaps you
6 have. I know that the Commissioner doesn't like these
7 areas of questions because they are personal opinions
8 so much, but I just fail to see the great distinction,
9 though between the surety bond and -- what you are
10 saying results from certain things that haven't been
11 done properly, and the obvious increased costs of manage-
12 ment of the herd which is going to result from the very
13 existence of the pipeline company in that region.

14 A I think that you are
15 going so far into societal decisions that I am not
16 prepared to follow you. I think that when society through
17 its political instruments takes a certain decision, it
18 lives with the long-term consequences of that decision.
19 It can attach responsibilities to the person who is
20 benefitting directly from the industrial development to
21 perform up to the standards that the government has laid
22 down in regard of it, but I wouldn't go further than
23 that.
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2 Q Would you go to the extent
3 then of even saying that the surety bond in principle
4 has any application to the caribou herd?

5 A Oh yes.

6 Q O.K., now how long will
7 the surety bond have to be kept in trust, pending
8 release, if we're talking about the Porcupine caribou
9 herd?

10 A This isn't my area of
11 expertise, I'm a biologist; but having been involved
12 in some governmental things, it seems to me that the
13 surety bond is in force until the government says that
14 "this project is completed, you've lived up to the sti-
15 pulations which we imposed upon you, and we now withdraw
16 the necessity for that bond."

17 THE COMMISSIONER: The question
18 is whether it is released at the completion of construc-
19 tion or whether it is released at the end of the life
20 of the pipeline, really those are the questions of
21 principle.

22 A Yes. Well, if you were
23 looking beyond the pipeline becoming operational, I
24 would assume that other kinds of regulations were imposed
25 but if operations, if you overload a vehicle and damage
26 a bridge you may be held responsible for damage that
27 you've done to the bridge; but these are operational
28 regulations and you've gone into a different frame of
29 reference, it seems to me, than you have when you're
30 constructing.

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2 MR. VEALE: I just want to
3 clarify what your Board means with respect to the surety
4 bond because if the pipeline at the time of abandonment
5 close to the surface pops up and causes great disruption
6 to the Porcupine caribou herd, is your concept that the
7 surety bond will be there then to pay for that damage?

8 A No.

9 Q It will not?

10 A No. I think that the --

11 Q That's a societal risk.

12 A Well, it's a societal
13 risk, but society may have covered off its bets in other
14 ways.

15 Q Well, let's hope so.

16 A In negotiation with the
17 company that's then operating that line there are --

18 Q In what other way is this
19 you're referring to?

20 A Beg your pardon?

21 Q What other way?

22 A Oh, we impose all kinds
23 of regulations. We impose regulations on the operation
24 of railway trains, highways, truck lines and so on.

25 Q No, but if the pipe
26 comes up at the time of abandonment and causes the
27 damage, what other ways is this imposed between the
28 contract between the society and the company?

29 A I'm sure society is
30 ingenious enough to devise the necessary protective

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2 devices. There's an experienced politician on the
3 Board and an experienced lawyer-engineer on the Board,
4 both of whom --

5 THE COMMISSIONER: Well, I
6 think it's time for coffee.

7 (LAUGHTER)

8 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

9 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

10 MR. VEALE: Mr. Commissioner,
11 I wonder if we could have a housekeeping detail just
12 before I continue cross-examination? I intend to make
13 a formal motion with respect to the issue of community
14 hearings on the Fairbanks corridor, and I brought it
15 up last December, and I was wondering if an appropriate
16 time would be Wednesday at four in the afternoon, or
17 perhaps Wednesday at 7:30 in the evening? I am flexible
18 as far as Wednesday is concerned.

19 MR. SCOTT: Mr. Commissioner,
20 could I suggest that it in fact should be done at one
21 of those times? The Community Hearings Committee is
22 in Yellowknife this week and will be meeting on Wednesday
23 at 5:30, which is why the end of the day isn't an
24 appropriate time for this motion. It seems to me that
25 it's a motion that can be heard without the necessity
26 of the Court reporters taking it down, so that it could
27 be heard in the evening if you prefer. But Mr. Veale
28 is right, he's hung fire on this for some time and I
29 suppose if he wants to have it dealt with it should be
30 dealt with this week.

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2 THE COMMISSIONER: Well, let's
3 hear it Wednesday at four then.

4 MR. SCOTT: Yes sir.

5 MR. VEALE: Q Dr. McTaggart-
6 Cowan, we left off in talking about surety bonds, the
7 cleanup of environmental damage.

8 THE COMMISSIONER: Oh, excuse
9 me, forgive me. Why not tomorrow morning at 9:30? It
10 won't take very long. I know the reasons why you're
11 putting it forward, at least I think I do. Wouldn't
12 that be all right? Then we'd just go through the day
13 without worrying about all this. All right, 9:30
14 tomorrow?

15 MR. VEALE: Certainly.

16 Q The thrust of my
17 questions, Dr. McTaggart-Cowan, relates to the problems
18 that arise when a project has been completed for a
19 number of years, and in the case of mining communities
20 it's often a question of revegetation of areas that have
21 been damaged and quite often the profits are long gone,
22 the mining company is long gone, and it then becomes a
23 burden of the government, and the government may say,
24 "We simply can't afford that." So my concern is that
25 the cost, the front end cost so that we can be assured
26 that the money will be there when the damage occurs,
27 now that is the context on which I was putting those
28 questions. Do you have any further comments on that?

29 A Oh, I understand what
30 you're driving at now. I completely agree with you.

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CrossExam by Veale

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2 I've seen far too many cases in which serious environ-
3 mental damage was done and simply left because the -- of
4 financial troubles of the corporation, went broke and
5 moved away, or there were no arrangements made earlier
6 on in the operation between the government and the cor-
7 poration to undertake the restoration which should have
8 been done. So I agree with you that a mechanism and
9 perhaps the only safe one is a front end mechanism,
10 should be devised, but I would separate this from the
11 performance bond attached to construction. That's what
12 I thought you were querying me on.

13 Q Well, you gentlemen are
14 here to help this Inquiry establish what that mechanism
15 should be, and I wonder if any of you have any views
16 on it, or whether you've discussed it, because it hasn't
17 really arisen in the Inquiry to date.

18 WITNESS TEMPLETON: Mr. Veale,
19 what we have said in our code is a bond on the construc-
20 tion phase, and what you're saying is, "How do you
21 finish ^{it} off?" I quite agree with Dr. McTaggart-Cowan
22 that in the past this has been inadequately done, al-
23 though there are some efforts now being made particularly
24 in regulated industries, and this is a regulated indus-
25 try, the pipeline business, and it has to provide state-
26 ments to the regulatory body, the National Energy Board
27 on its profits and operations and its rates and all
28 this sort of thing, and it's not hard to under those
29 circumstances to see how it is going and when the end
30 comes, is known and predicted by the regulatory body

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2 long before it occurs, and it's not entirely unusual
3 to require during that latter period of the life of the
4 project to take care of the abandonment. This was done,
5 for example, in Manitoba in Brandon and Winnipeg where
6 central heat companies were operating, and they started
7 -- it became obvious that they were going to start to
8 lose money and that they would have to sooner or later
9 go broke or close up, and so the regulatory body required
10 them to put their -- some of their reserves, money
11 reserves, into a time so that the restoration and the
12 abandonment of the line could be done in an easy manner,
13 and I think perhaps that's a more practical way than
14 to try to set aside a sum of money at this time when
15 you don't know the life of the line. We don't really
16 know whether -- at least I don't know whether it's 20
17 years or 50 years. It's hard to set a sum of money
18 aside now to handle that. You know, they're taxed and
19 you can vary the taxation on it so that you can really
20 in a regulated industry get the money, if your utility
21 regulation is adequate.

22 Q So your basic thrust is
23 that the pipeline agency that the Protection Board poses
24 would be the agency that would presumably deal with that
25 during the course of the -- well, that's not what you're
26 referring to because the pipeline agency self-destructs
27 at the end of the construction period.

28 A Well --

29 Q Who then does it?

30 A -- the agency we're talking

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1
2 about self-destructs at the end of the construction
3 period, but what is now the National Energy Board's job
4 is to supervise the operation of that pipeline as long
5 as it's being used, and including the abandonment.

6 Q So then the Porcupine
7 caribou herd and the whole issue of insurance that if
8 damage occurs is then left to the National Energy Board?

9 A Yes.

10 Q Well, Dr. McTaggart-Cowan,
11 there is one issue that I would just like to have you
12 clarify, and it relates to certain recommendations that
13 you made with respect to caribou, and the code has in
14 14.6 has a particular recommendation, and it talks about
15 "Aircraft shall maintain minimum altitudes of
16 500 feet above ground or water level where
17 individual caribou occur, and minimum altitudes
18 of 2,000 feet above ground or water levels
19 where migrating herds of caribou occur, and over-
20 flights of caribou herds shall be prohibited
21 during the month of July."

22 WITNESS McTAGGART-COWAN: Yes.

23 Q Now, at page 6217 of the
24 Volume 47, your evidence in June, you made this statement,
25 you said:

26 "And the restraints required are:

- 27 1. Avoid over-flying caribou between May and
28 October, in any event remain above 2,000 feet."

29 Now, I find some discrepancy there in the sense that the
30 one you've given in your evidence seems to me to be much

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broader and comprehensive than the one that is actually
printed in the code, and this morning again you reiterated
how 2,000 feet was the important.

A My review of the data that
has come in subsequently to our preparation of the code
leads me to the broader stipulation which I specified
this morning.

Q So that the discretion on
the part of a pilot no longer exists as to whether he
has a few scattered caribou or a small herd, it's
2,000 feet.

A That's the issue, yes.
One has to remove as much of the discretion as possible
so that it's an easy direction to follow.

Q So I presume then, Mr.
Templeton, we can amend the code to that extent.

WITNESS TEMPLETON: Yes.

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Q Dr. Wilimovsky, Dr.

McTaggart-Cowan and I discussed the issue of oil spills and preferences for route and it was my feeling that fisheries men take a different view of oil spills, and do you have any different view on this respect with route preference than Dr. McTaggart-Cowan?

WITNESS WILIMOVSKY: I have already expressed my view that I prefer the coastal route and in making that analysis I used a number of species, crossings, conditions and so forth, but in the back of my mind, I personally took the view that if a gas pipeline is made, other lines were possible and might follow. We have held in our Institute some workshops on oil ^{spills} we have not studied an oil pipeline on this Board. Based on these other studies, the damage that you get from a hot oil line is dependent on the topography, specifically controlled by the contour of the land and involves such things as slope, area of the basin and rather importantly in terms of fish now, whether the ^{spills} takes place in summer or winter. Another important factor which I have not looked into in terms of Prudhoe crude, although the data exists, is on the high fraction component of that. In terms of aquatic life it is this volatile component that causes the kill, that that causes such public outcry, the black residue which is so offensive to the eye and to your clothing if you bump into it, is not a killing factor in the case of fish. This is not true for terrestrial animals, obviously, and birds, but in aquatic organisms; there has been a reasonable amount of

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work done on this, it's the volatile component that causes mortality, and it in terms of the aquatic environment would be much harder to control on an inland route than along the coast.

Now, one of the things that concerns me is the varying definitions of this so-called coastal route. As an individual I shove any pipeline, any gas pipeline, let's keep this clear, as close to the water as possible, short of having it disrupted by ice or storms and near to this, hopefully never, but if an oil line were to follow, it seems to me that with the large gravel component, the fact that a large part of the year the area is ice covered, you would have more time to keep the volatile component from getting to the aquatic environment. Now, I want to emphasize that my remarks are applying to the aquatic environment and Dr. Cowan rightly could disagree violently with some terrestrial forms, but you would have a longer time, more of a delay factor, a blotter to keep the volatile elements from getting to the water and then in that coastal area I think cleaning up the eyesore could potentially be an easier and that is only a relative term, an easier process. There are now techniques in semi-still water to pick up oil off the surface and the United States Coast Guard, Shell Oil, and a group from the Canadian Government have all been looking at this problem.

Q Thank you, Doctor. Mr. Gourdeau, in your evidence in the spring, you mentioned in one line that native peoples could play a more active

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role in game management, I think you said, resource management, which I take to mean game management principally because they don't take to mining that much. Can you expand and elaborate --

WITNESS GOURDEAU: Why not?

Q That's land claims. Can you expand or elaborate on that and give us an example of where it takes place now that you are aware of in your experience?

A Well, if you talk about game management on a large scale and a structured one for a vast area, I don't know of any in Canada. But I know of some achievement in that direction. I know of one around Fort Chimo in northern Quebec where the Inuit people have been recognized by the government of Quebec by the general branch of New Quebec, in fact about five years ago, as being the sole ones to have the capacity or the competence or the authorization to operate outfitter camps. So, in fact as it turns out, they became the managers of the game, for all practical purposes, in this area, and it went very well from what I know.

Q Well, you often hear from biologists that native peoples are a great part of the problem in the deterioration of game and so on and you are stating then that this hasn't occurred in the particular instance that you are presenting now in Fort Chimo.

A No, exactly.

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1 They have, probably a better preparation and a better
2
3 consensus about the necessity for them to operate things
4 as properly as possible in order to sustain, so to speak,
5 the biological productivity, if -- or to do something
6 like that. So they were very conscious of that and
7 even if they had no diploma in biology, they could
8 probably act as if they would have recognized knowledge
9 of that.

10 MR. VEALE: Thank you. I
11 have no further questions, Mr. Commissioner.

12 CROSS-EXAMINATION BY MR. HOLLINGWORTH:

13 WITNESS BLISS: Dare I interject
14 in terms of that last question and point out -- I believe
15 I am correct in saying, that the last two years three
16 or five native families in the Delta have been managing
17 the reindeer herd there. They have taken this responsi-
18 bility over from the government and are now doing
19 this. Only time will tell whether this will be success-
20 ful on a long-term basis, but at least here again is a
21 new direction.

22 Q Dr. Wilimovsky, I think
23 you are the proper person to direct this question
24 to and I am referring you to volume 46, page 6078 at which
25 time you spoke of a second study assessing the effects
26 of construction on stream environments in northwestern
27 Canada and you stated that it wasn't ready at that time.
28 It is from Mr. Craik's evidence, but I thought perhaps
29 this might be your area of expertise.

30 WITNESS WILIMOVSKY: Would
you refresh my memory, sir?

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Q Yes, perhaps I can
read directly from the evidence, page 6078 where you
state:

"The second study assessed the effects of construction on stream environments in north-western Canada. The objectives of this study were to use disturbances to calibrate and further understand the impact assessments which have been previously made on the basis of office studies. The report of the study is not yet available as we only recently received a draft from the researchers."

And my question is whether that is now a publication which is available.

A I don't believe it is a publication. It may be an internal document. My knowledge of the results of that exercise, a number of people from -- at the request of the Board visited some sites and it included Mr. Doran, who discussed verbally some of his results with me, but I don't recall seeing a formal report on this. Perhaps Mr. Templeton could refresh my memory.

WITNESS TEMPLETON: I am sorry, I am having difficulty hearing you, Mr. Hollingworth.

Q It is a reference to a study on stream environments and the effects of construction on them, and it is referred to on page 6078, that is in Volume 46. I wanted to know if that report was now available.

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2 A Yes, now I know. They --
3 that report was started with the idea that they would
4 -- it was trying to work out what they called a "rough
5 and ready" methodology for determining impact on streams.
6 It was an experiment and they were using it with -- they
7 were trying to measure the biological component as
8 indicators of whether there was a problem in the stream.
9 They were all having trouble as to how you measure
10 impact. It didn't work out the way they thought. The
11 experiment wasn't a success in itself. It did produce
12 some other information and I believe it's been written,
13 I know it has been written up but it didn't -- and I
14 think it's in our list, in our library, and it's cert-
15 ainly available but it didn't produce the information --
16 the methodology that would allow us to predict impact
17 as we set out to do.

18 Q Well, would the report as
19 written be available by writing to you in Winnipeg?

20 A Yes.

21 Q And Volume 47, Dr.
22 Wilimovsky, on page 6160, you make reference to three
23 or four studies done for the government indicating the
24 potential quantity of gravel for the projects to be
25 adequate and available from outwash plains. What
26 references were you referring to in making that
27 statement?

28 WITNESS WILIMOVSKY: The material
29 that CAGSL provided and some interchange at meetings
30 between their professional people and our group. I was

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1
2 initially very concerned about the gravel-sediment
3 question and was convinced by their group and some of
4 our own staff that if the fossil flood plain gravel were
5 used, and the inactive channel area, that in most parts
6 of the area of concern that there would be adequate
7 gravel; and as you are well aware, there was testimony
8 by people more expert on quantities of gravel than
9 I on how they would take it and from where.

10 Q And did you have any
11 reference to the DIAND study when you were making
12 these statements?

13 A No sir.

14 Q Dr. McTaggart-Cowan, in your
15 evidence in Volume 47, page references are page 6220,
16 you're discussing blasting. I wondered if you had any
17 specific recommendations for the actual distances that
18 caribou and other animals should be away from the site of
19 blasting, in other words how far away should these ani-
20 mals be before blasting is permitted?

21 WITNESS MCTAGGART-COWAN: I'm
22 sorry I have no evidence that would -- no scientific
23 data on which to make such predictions.

24 Q And Dr. Wilimovsky, on
25 page 6414 you referred to gathering more information on
26 blasting. Have you updated your information since your
27 testimony in June?

28 WITNESS WILIMOVSKY: Yes, I
29 have. There has been a considerable amount of work
30 in this area, and one of the participants at this

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2 hearing has brought to my attention a recent Canadian
3 Government document that has just been released, a
4 seminar that they held here in Yellowknife May 12-13,
5 1974 entitled:

6 "The offshore seismic seminar,"
7 published by Environment Canada, Fisheries & Marine
8 Service. That was just shown to me this morning, so I
9 haven't had a chance to even look at it; but in terms
10 of experimental work, the defense (that's spelled S-E),
11 the Defense Research Agency in the United States has
12 carried on a whole series of experiments trying to
13 quantify the effects of blast on underwater organisms,
14 and there are a number of classified and unclassified
15 documents, a bibliography of the unclassified documents
16 is available. As I indicated, I believe in earlier
17 testimony, there is a wealth of experience on how to
18 disperse aquatic organisms in unfrozen waters from the
19 blast producer in order to get seismic profiles. Indeed,
20 for some types of profiling you don't have to use an
21 explosive at all, but a new type of pinger that operates
22 under compressed air. The situation when using blasting
23 for non-seismic purposes, for construction is different
24 and the situation for both types of experimentation is
25 different under ice and provides a third set of condi-
26 tions. In terms of seismic exploration there is no need
27 to hurt the aquatic organisms in the present state of
28 the art, and this has been documented in Canada, Australia,
29 the United States, the United Kingdom, the Middle East
30 oil regions, working offshore.

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Now when we talk about higher explosives, be they for construction or military purposes, you have a different set of conditions, and three factors, three or four factors have been identified as controlling mortality in aquatic organisms. First the fundamental nature of the organism, that is whether it has an air bladder and how it's connected. Secondly, the peak pressure of the explosive. Secondly the integrated pressure over time -- thirdly that should be. And fourthly the shape or spectrum of that pressure wave. It has been found in fishes that pressure waves with a rapid decline, negative residence factor, causes more kill than that which -- than an explosive which burns off slowly. An example of this might be a shape charge for knocking down a bridge has a very sharp negative pressure as opposed to something like 60% dynamite which falls off very slowly. The fact that some fish are extremely sensitive to this negative pressure can be shown by two non-explosive examples.

Sometimes in the old days people moved hatchery fish from one pond to another with a hand pump. That little negative pressure sometimes could kill small fish. The common practice of United States and Canadian Governments is to plant fish by aircraft. If the airplane went up too fast it had disastrous effects on the fish they were going to dump out. If they dumped them out at 2,000 feet, the positive pressure wouldn't kill them when they hit the water; but vice versa was extremely dangerous.

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Coming back to the mortality of the matter, there is a relationship between peak pressure and animal size, and it is possible to very precisely say, if you know the size of the animal, what you should stay below in terms of prediction, and so on and so forth, technical people could use to specify recommendations. When it comes to ice, with explosives for military or construction purposes, there are complications due to the reflective nature of the ice, and this has to do with the composition of the ice, its density which you know varies with the amount of salt in it, and if you're working off the coast and ice is old and of course it's always fresh, in the inland areas it's always fresh obviously, so you've got this complication of density. But you can get increased mortality or increased pressures which could have an increased mortality of 20 to 25%. These data are based on true experiments with controls in the laboratory at a Defense Research Agency installation.

Q On the basis of the new information you have, have you changed your conclusions that you reached in your June testimony?

A No sir.

Q Mr. Templeton, I refer you to your Volume 2 towards an environmental code and also to your volume guidelines for environmental training of pipeline construction workers, and there are a couple of comments you make in those documents. One is that you would develop methods designed to

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1 enhance a worker's experience of the environment and
2 introduce workers to the culture and life-style of
3 northern people; and in the training manual you speak
4 of adding to our knowledge of northern ecology through
5 field notes taken by interested trained workers. Now
6 have you given any thought to the actual methodology
7 of going through this process of educating workers, and
8 if so, what suggestions have you?
9

10 WITNESS TEMPLETON: Yes, we
11 provided in our list of exhibits -- or not exhibits,
12 list of reports, we provided Canadian Arctic Gas with
13 sort of a strategy needed to train construction workers
14 and also how it related to the training of the environ-
15 mental inspectors of the agency, because these two
16 organizations must work in parallel and have certain
17 inter-actions between them, and this is a big program,
18 and to train the workers it's like setting up major
19 School Districts, and you wouldn't expect to do that
20 overnight, so it takes a long time to do that, it takes
21 a lot of time to decide what you're going to teach,
22 how you're going to teach it, and train the teachers.
23 So we haven't got the whole program worked out but we
24 did supply a report called:

25 "Guidelines for environmental training of
26 pipeline construction workers,"
27 dated July '73, prepared by Messrs. Oetting and Doyle,
28 and that's in our list of reports and is available.
29
30

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1 Q Yes, I am aware of that
2 document, sir, in fact I referred to it in my initial
3 question. I just wondered if you had gone beyond any of
4 the statements set out in that manual to come to specifics
5 as to how you would train 4,000 plus construction
6 workers, what level you would provide to the various
7 levels of workers. Would you provide more to supervisory
8 personnel, for instance, and if so, how much?

9 A Well, I think that you
10 have to train, and I think that there are some twenty
11 guidelines, or something, in that report of things
12 to, sort of bench marks that you start from. Each group
13 has to be trained in a different way. We even suggest
14 the training of the management. It might be somewhat
15 difficult, but that is a facetious comment, I am
16 sorry.

17 But there are certain things
18 to make the management understand why you are doing
19 these things, and then you get right down to the con-
20 struction worker who obtains his training in a much
21 different way and much more visual type of presentations
22 and the time that you give it to him, if you set it in
23 a classroom, he is not used to that so you have got
24 to figure out a way of getting to him in a way that he
25 can absorb what you are trying to tell him.

26 Q That is my point. Have
27 you thought of ways to do that?

28 A No, well, we have outlined
29 sort of the strategy of doing it. We do not have -- we
30 have not been able to conduct it beyond that, we have no

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funding for that.

Q I presume you would visualize the least amount of training for a specific worker on a specific job and then his foreman would have a bit more and his supervisor would have a bit more of an overall grasp of the situation?

A Well, it would probably be a little more or it may be a different type, depending on the effect that he can -- the whole idea is that each person is trained in relationship to the damage to the environment that he can cause, and so that is why it is quite a job to train the different levels of workers in a different way, and also there is their language problems.

Q Do you see any different form of training for people who aren't specifically under the jurisdiction of an applicant, for instance, barge operators, or the catering personnel?

A Yes.
Barge operators should be trained or have the knowledge of the things that he, as a barge operator, can do to the environment.

Q But how do you see obliging that worker to undertake the study for us?

A Well, we say it is incumbent on the applicant to make some kind of arrangement with his contractor, subcontractors and suppliers that if they are going to work on the project they have to take some of that.

Q Well, I understand that,

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1 sir, and I think that it is fair to say that both
2 applicants would strive to do that, but I just wondered
3 if you had any further suggestions beyond contractual
4 obligations in order to bring that type of program
5 about?

6 A No, except for the laws.
7 You know, there are laws and we are not suggesting that
8 the laws are superceded by the code. We say the code
9 in the introduction, or the preface, says that the
10 laws of the land shall be maintained and this is just
11 a supplementary, but the contractual obligations is
12 really the way, I think, you get at them, and because
13 if you just suggest to them that construction workers,
14 if they look after the environment, you are not going
15 to get anywhere.

16 Q I think I would agree
17 with that.

18 A The requirement that the
19 company loses money on its bond is one way that you
20 indicate to him, the applicant, that he has got to
21 do something about it.

22 Q Now, the Board has identi-
23 fied the need for specific environmental inspection
24 personnel, but I believe you visualize that they are
25 all to answer to the project manager?

26 A Yes.

27 Q What sort of a program
28 would you think is necessary for the project manager
29 in that case to appreciate the issues involved?

30 A Well, he has to be trained

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1 in many things: safety, the getting the work done, the
2 technical reasons, and we would ask that he also have
3 the responsibility of looking after the environment and
4 the social things, too, because he is the authority, and
5 this is why I am not in favour of just having a few in-
6 spectors down the line somewhere who can't influence the
7 project manager. The man that has the responsibility
8 for the project has the responsibility to look after the
9 environment and the social issues as well as the adequacy
10 of the economics of the project, and if he doesn't you
11 lay claim against his bond.

12 Q Well, then presumably
13 the Environmental Training Program, at least for this
14 gentleman, would be pretty intensive.

15 A Well, not -- he doesn't
16 know all of the details of any of the job. His job
17 is the management of the people, so he has to have
18 people under him who are competent to advise him and he
19 manages that. So he needs an appreciation, but he doesn't
20 need to know all the details of the environmental issues
21 of birds if he has competent people working for
22 him.

23 Q Well, then, do you regard
24 it as necessary to have an expert in each of the
25 specific disciplines at each spread in order to advise
26 this supervisor?

27 A Yes, every spread needs
28 people who can speak on all of the environmental issues
29 and in addition the head offices or area offices, or
30

1 whatever, needs additional backup at a more senior
2 level, because you are not going to get a very senior
3 ecologist to be sitting on every one of those spreads,
4 so you are going to have to have some kind of technical
5 relation with people back in other southern offices
6 where it is nice and warm to advise them.

7 Q Well, as a senior
8 ecologist in the head office, whether it is in the
9 south or in the north, what type of training would the
10 experts in the individual disciplines on the spread
11 have, as you visualize it?

12 A They would have to be
13 trained in the likelihood of impacts. They have got
14 to have studied what is liable to happen in that spread
15 that he is going to work on and what can happen and
16 how do you prevent it and that is why we made in our
17 code, or in our atlas, we put little flags up. It says
18 in the spring there is a problem with an oil spill or
19 overflights for birds and he needs to know all of the
20 problems in his spread and the reason for the senior
21 people back home is to train that man so he knows those
22 things and he knows why they are being done and be able
23 to, if things don't go the way he anticipated, he can
24 refer back to somebody, or possibly he can refer, if the
25 project manager on this spread is not particularly
26 sympathetic. He can go back and get some help.

27 Q I guess we're coming to a
28 resolution here. Then what I suggest you are thinking
29 is that the individual expert, say, on fisheries on
30 spread "G" is not necessarily a PhD in ichthyology

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He is someone who has a general grasp and a general
appreciation of the environmental concerns on that
spread and he can refer to head office if he has
to.

A I would imagine that that
is so.

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Cross-Exam by Hollingworth

1
2 Q Now in the discussion of
3 the supreme authority to oversee the project --

4 A Sorry, I didn't hear that
5 first --

6 Q Discussing the supreme
7 authority which would oversee the pipeline project,
8 I assume that you would give such authority the power to
9 shut down the operation.

10 A You're talking about the
11 agency now, the supreme authority?

12 Q Yes.

13 A What we call the agency?

14 Q Yes.

15 A Yes, certainly.

16 Q Now, have you any ideas
17 on procedures to get a fast resolution to specific
18 problems so that the work could start up again in the
19 minimum amount of time without over-riding the ecological
20 concerns?

21 A Well, the smooth operation
22 of any construction project is how well it's planned
23 ahead, so that if you've thought of all the problems
24 of what you do, you can -- you've gone much the way to
25 resolving them before they occur. And if you have a
26 proper inter-action between the agency and the pipeline
27 company, you can be pretty well organized to be able to
28 handle these problems that come up. This is a great
29 worry to me, is this problem of leaving it to shut
30 down, as the means by which you make the pipeline

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Cross-Exam by Hollingworth

1
2 company do what you want it to do, because it's very
3 difficult to do in the middle of winter and you're
4 arguing about something that might happen next summer,
5 and so I think there's a need -- there needs to be a
6 great deal of skill and thought and a lot of planning
7 done ahead of time. This is what I mentioned yesterday,
8 that the traditionally the pipeline companies haven't
9 done all of that planning ahead of time. They've been
10 geared to doing it in the field as they go, and I fore-
11 see problems with the environment if the traditional
12 ways were used. Now, I'm sure that I'm not trying to say
13 that the applicants are planning to do it that way. But
14 it's inherent in the industry.

15 Q Well, I think you'll agree
16 that probably more planning has already gone into this
17 project than any pipeline projects you've ever dealt
18 with.

19 A Any pipeline project,
20 Q:
21 that's absolutely correct. /I think it's also fair to
22 say that no matter how much planning you have, I think
23 anyone is going to say that that is the best procedure.
24 You still might have a situation where there's going to
be a shutdown. It happened on the Alyeska line.

25 A Yes.

26 Q Now if you have that
27 shutdown, have you given thought to the procedures that
28 would take place at that time in order to get the
29 fastest possible resolution of the problem in order to
30 proceed again with construction?

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1
2 A Well, it's purely a matter
3 of management problem between the pipeline company and
4 the agency, and if that's properly organized at first,
5 like any management problems, it can be resolved. They
6 tell me that I should be saying "environmental problems".
7 I assumed that I was saying that.

8 Q All right. Now going
9 back a minute to the environmental inspectors we were
10 speaking about on each spread reporting to the project
11 supervisor, do I understand you to say that in addition
12 to those people who would be working for the pipeline
13 company, there would also be people working for the agency
14 with similar qualifications?

15 A Yes.

16 Q Or would they have greater
17 qualifications?

18 A I don't think they would
19 necessarily be different.

20 Q Do you foresee then the
21 agency staff as being in much the same position as the
22 pipeline company, that is to say the people who have a
23 general appreciation for the concerns being out on
24 each spread and being able to phone head office, wherever
25 that may be?

26 A Yes.

27 Q To voice their concerns
28 to an expert.

29 A Right, I knew the inspec-
30 tors or the environmentalists on the pipeline company's

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Cross-Exam by Hollingworth

1
2 job is to influence the management to look after the
3 environment, how it's done. The agency's inspectors
4 are to see that it's done so that their roles are
5 different. The agency's environmentalists are not
6 telling them how to do it. The pipeline company's
7 environmentalists are to tell them how to do it.

8 Q But apart from that
9 distinction, they are completely parallel organizations
10 on a spread.

11 A Yes.

12 Q Now, if I could just
13 clarify this business of the environmental or the inde-
14 pendent auditing group.

15 A Yes.

16 Q Is this someone distinct
17 from the agency?

18 A Absolutely. It would
19 report only to the public. It would report publicly and
20 have no line function whatever.

21 Q So that it would have no
22 jurisdiction to stop or start a project. It would have
23 no input into the agency or into the pipeline contactors.
24 It would just speak to the public alone.

25 A Well, it might have an
26 input by virtue of writing news letters or issuing public
27 statements.

28 Q But any authority it had
29 would be moral suasion.

30 A That's right, it would have

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1
2 no authority. There's no use splitting up authority.
3 You've got an agency who has the authority, and their
4 job is to do it, and all you want is to see that they
5 do it. You want to see that the pipeline company and
6 the agency that were set up to do jobs have actually
7 done it and report publicly.

8 Q Now, do you foresee the
9 project proceeding on the basis that there could be
10 minor route adjustments as you went along in the field?

11 A Yes, I expect there
12 will be.

13 Q And if that's the case,
14 what would you view happening, would there be a shutdown
15 to consider a minor refinement that was encountered?

16 A No, I think the agency
17 and the pipeline company would handle those in a way
18 and I think we cover that in the code that when the
19 pipeline company wanted to build a section, that they
20 would give a preliminary report -- I've forgotten the
21 name of it that we called it now -- and then the agency
22 has 180 days to respond and tell them whether they can
23 do it, and most of the revisions I think would be taken
24 at that time. Now there's the odd time when you find
25 something that was not anticipated. Then you have to
26 make a -- you have to make some kind of an adjustment
27 in the field if you hit something that you didn't expect.
28 But the agency in the construction business this is
29 usually handled in the field. If it's a major one it has
30 to be referred back to higher authorities, but --

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Q What do you consider a
major one over a minor one? Do you have a definition?

A Well, if you were --
supposing you were putting in a river crossing and
the people who had investigated it had missed observation
that there had been past river bank slides, and when you
got there you found there was and you found that half
a mile away there was a better crossing. I would think
that that could be handled in a regular way. Or as a
route revision at the time.

Q Well, I'm just going back
to your 180-day time that the agency has to respond and
I'm thinking of a situation where possibly one discipline
objected mightily to the change half a mile away, and
all the other disciplines thought it was a good thing.
What do you foresee happening if such a revision arose
in the field?

A If we had a -- it would
probably be referred back to the head offices of both
the agency and the pipeline company and it would have
to be resolved. If the head office of the agency said
that was a serious enough thing, the revision would not
be allowed.

Q And while that decision
was being made presumably construction would be at a
halt.

A Yes.

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Cross-Exam by Hollingworth

Q Now, you talked about
finalized environmental codes in the future, and would
you anticipate those providing specific construction
methods and requirements --

A I am sorry, I missed your
first phrase.

Q You talked about finalizing
environmental codes.

A Yes.

Q Would you anticipate
those giving specific construction methods and requirements
or would those be left, in your view, to the applicant?

A Well, I think the code is a
general performance that is expected. It is not a
detailed specification, it just says in general the
performance that you expect ^{of} the pipeline company.
The pipeline company, according to the code, would be
required to submit preliminary plans of how they are
going to build each section including things like
contingency plans and all the rest of it needed to
build that section and then the agency has 180 days to
respond, and then the pipeline company submits the
detailed plans of river crossings and all those sorts of
things which, again, are approved, and this is done
ahead of time to relieve the dangers of confrontation
in the middle of the work.

Q Now, referring to winter
roads and the possibility of shutting them down at
any time despite prior approvals, Mr. Longlitz gave
evidence that advanced warnings of up to a month ahead

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1 of time were often given and presumably you would
2 regard these as a desirable thing for the agency and the
3 pipeline company to work toward providing, would
4 you?

5 A I think Dr. Adam is more
6 familiar with Mr. Longlitz' testimony. I can answer
7 it if you like.

8 Q Go ahead.

9 A Well, I think the whole
10 matter of the shutoff date, and I think that is what
11 you are speaking of now, is the shutoff date, is a
12 difficult one and it can't be planned too far in advance
13 because it is dependent on the weather, although you get
14 an indication and I think in the land use regulation
15 way, or the land use inspectors do give notice that
16 it is liable to be shutdown on a certain date and then
17 they may extend it, depending on the weather, and I
18 think that -- I don't think that we were in that much
19 disagreement with Mr. Longlitz that you can do that, but
20 the pipeline company is going to have to be pretty
21 flexible to meet that shutdown date because they
22 can't suddenly pull all these men out overnight and
23 get all their equipment to a central depot and everything
24 else, so they have got to do some pretty intensive
25 planning to be able to meet it.

26 Q Dr. Adam, your criteria
27 for commencing snow roads are eight inches of snow and
28 550 degree days south of the 68th parallel and four inches
29 of snow and 550 degree days -- these are degree days
30 below freezing -- north of the 68th parallel? Is that

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1 right?

2
3 WITNESS ADAM: Yes, that is
4 basically the criteria.

5 Q Now, is that the criteria
6 for the commencement of hauling on the roads or the
7 commencement of construction of these roads?

8 A It is basically the
9 earliest date that you could start constructing the
10 road itself.

11 Q All right, and I have
12 the same question in connection with Figure 6 in
13 Chapter 2 of the Environmental Impact Statement, more
14 specifically that is on page 33, a chart entitled,
15 "Optimal Time to Begin Winter Arctic (Construction)"

16 THE COMMISSIONER: Maybe, Miss
17 Hutchinson, I could have that. What volume is that?

18 MR. HOLLINGWORTH: That is
19 volume II, I think, sir. No, it is volume IV.
20 Page 33, sir, Figure 6.

21 THE COMMISSIONER: I am sorry,
22 what is that again, page what?

23 MR. HOLLINGWORTH: I have it as
24 page 33, but that is from the large volume and I don't
25 know --

26 THE COMMISSIONER: Figure 6?

27 MR. HOLLINGWORTH: Figure 6.
28 My question is whether that refers to construction
29 generally or construction of the road.

30 A Well, the assumption
was here, as I said the last time I was here on cross-

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1 examination, was that at the time I did this work, I
2 was attempting to show that even giving CAGSL the
3 benefit of the doubt about starting early and finishing
4 late, that they still had a problem in completing the
5 spread and at that time they were proposing beginning
6 construction on January 1st. Since that time, I would
7 like to think partly because of my analysis, they have
8 changed that and they have moved now into utilizing the
9 time available before the new year. So, to answer
10 your question specifically, I assumed that they could
11 start construction of the pipeline almost immediately
12 after they started construction of the snow road. That is,
13 they would only have to lay a mile or two and then they
14 could start going with construction of the pipeline.

15 Q Well, the question was
16 put earlier in the proceedings to Mr. Williams of
17 Arctic Gas asking if in his experience the pipeline
18 contractor would be willing to start up with all his
19 men on the basis of one mile of snow road being built
20 when further down you may have areas that can't
21 have a snow road built over them. Now, he seemed to feel
22 confident that a contractor would start up, and I am
23 wondering if you have any experience to disagree or
24 agree with him.

25 A I have no experience on
26 that.

27 Q But could you not see
28 a situation where past your initial mile of snowroads
29 you have an area of peat land that hasn't frozen suffi-
30 ciently yet, or you have a stream upon which an ice bridge

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can't be built?

A As I have said, I have given them the benefit of the doubt, that I have assumed that they would set up spreads and so on so they could start as soon as possible and have terrain on which they could work.

Q But it would call for a pretty exquisite degree of planning?

A That is right, my analysis is theoretical.

Q Now, in your experience, how long would it take to construct this initial mile or two of snow road?

A I would say that you are looking at a minimum, and this is assuming that you have got men and equipment in place to start at the earliest possible time. I would say that you are looking at a minimum or even a mile or two of five days to seven days.

Q Now, does that assume that the snow is in place or that you have to haul it from other places?

A I think if you are organized it would make little difference as far as the time, unless you were in a very critical location where you had long haul distances for the snow.

Q But if you just had had 550 degree days below freezing, isn't it possible that a good many of the lakes and sources of snow for construction would not be frozen over?

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1
2 A I think in certain areas
3 that that is probably true. On the other hand I now
4 have indications and I think this is fairly general
5 knowledge within the snow road industry, if I can call
6 it that. You can start preparation of the road bed
7 even before you have 550 degree days. Now, I have
8 spent a little time this morning doing some calculations
9 on the basis of the dates that Mr. Williams gave in
10 his testimony as to when people were observed to have
11 started and they run in the order of 230 degree days,
12 200, 335, one is 540, one is 336 degree days, and these
13 were cases where they were observed to be operating
14 in the field.
15
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Gourdeau, Thomson
Cross-Exam by Hollingworth

1
2 Q This is to bring on frost
3 penetration and processes like that?

4 A Yes. The one with 540,
5 it's difficult to determine exactly what they were
6 doing. It just says,

7 "Reading on down the list on November 14th,
8 D.P.W.'s technical crew started working on
9 the Blackwater River,"
10 whatever that means.

11 Q Were there also observa-
12 tions to see what the roads looked like when the spring
13 thaw had come in those particular instances that you
14 know of?

15 A No, but my philosophy here
16 is -- and maybe I'm being generous to CAGSL -- I think
17 not, if Gulf or Reindeer Winter Road Company or whatever
18 is allowed to start operating at that time, I see no
19 reason why you couldn't assume that CAGSL could start
20 operating at that time.

21 Q All right now, isn't it
22 also true though that the applicants -- and I'm referring
23 to either applicant in this case -- are proposing
24 schedules and loadings that are far in excess of any-
25 thing that has yet been undertaken in the north?

26 A Yes, I think that's true,
27 although at Norman Wells I was satisfied that with
28 simulated pipeline traffic, and in this case some of
29 the wheel loads, not the maximum total load but the
30 wheel loads, exceeded what normally would be put on

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1
2 tandem truck trailers by close to a factor of two. I
3 just forget the relationship, but the wheel loads were
4 higher than anything that is proposed on the project.

5 Q Well, I suggest to you,
6 sir, that with the schedules and the loads that are
7 contemplated that to err on the side of conservatism
8 would be far and away the best advice, rather than
9 accepting the benefit of the doubt, or giving CAGSL
10 the benefit of the doubt and being generous to them.

11 A Oh, I don't quarrel with
12 that at this stage, but what I was trying to show at
13 the particular time, I thought was the best approach.
14 I certainly do not quarrel that 550 degree days is a
15 minimum criteria; but like all the other environmental
16 matters, I put a lot of my faith in this agency, that
17 they're going to have people that know about winter
18 roads and I don't care if it's 550 degree days or 2,050
19 degree days, that they still have the authority to
20 look at it and say, "No, there's no way you're going
21 on that." They've got to have that authority, but
22 the 550 to me is just a minimum requirement. At least
23 they'll go out and take a look at it when you get close
24 to 550 degree days.

25 Q And it's also true, isn't
26 it, sir, that those limits that you set-- and I'm quoting
27 from page 31 of the same report -- were based on
28 "a few observations of first and last days
29 of winter road use with the criteria being
30 established imperically."

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1
2 Isn't that correct?

3 A That's correct.

4 Q Now, you probably are
5 familiar too with Mr. Jarvis appearing for Foothills
6 Pipe Lines suggested that construction could start be-
7 tween 550 degree days and 750 degree days of frost,
8 and 48 inches of snow, and I think that's somewhere in
9 line with your figures. But that hauling should wait
10 until 1,600 to 2,000 degree days, ^{have occurred.} Now, I think it's
11 also fair to say that Mr. Jarvis was then assuming that
12 he wouldn't have to haul snow from other points, and
13 that he would be waiting for ice bridges. Now do you
14 regard those figures as reasonable?

15 A Could you repeat that
16 last phrase, please?

17 Q Do you regard those figures
18 as reasonable, the 1,600 to 2,000 degree days?

19 A I would personally feel
20 that they may be somewhat high. I think I would be
21 more in agreement with Mr. Williams that probably 1,000
22 is reasonable.

23 Q Do you feel 1,000 is
24 reasonable if you are going to make two assumptions?
25 One of ~~these~~ is that you don't have to haul snow, and
26 the second assumption is that you want your ice bridges
27 to be ready and in place.

28 A Well, they're inter-
29 related problems because if you start hauling snow or
30 if you just start constructing 550 degree days, by the

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CrossExam by Hollingworth

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2 time you finish, that is by the time this five days or
3 seven days have gone by, and of course it depends on the
4 temperature, you can accumulate a fair number of degree
5 days.

6 Q Well, in your experience
7 is 1,000 degree days adequate to establish an ice bridge
8 that can carry the loads contemplated by either of the
9 applicants?

10 A Well, here again I think
11 it certainly depends on the crossing, it depends on the
12 river, depends on the dissolved solids in the water,
13 different rivers freeze even under the same conditions
14 at different times. There are many, many variables
15 involved and I would be somewhat skeptical of river
16 crossings that early; but here again I must confess that
17 I just assume that a certain amount of common sense will
18 be used, that is you wouldn't start a spread a mile
19 from a river and work towards the river. Now maybe I'm
20 -- maybe that's a bad assumption on my part but I've
21 assumed that you just would avoid those types of situa-
22 tions.

23 Q All right, and assuming that
24 1,000 degree days could be adequate or might not be,
25 given the situation, is that in terms of an average
26 winter? I suppose that really doesn't make much difference,
27 does it?

28 A Well, it does in one sense,
29 and that is the amount of snowfall because if there's
30 been a lot of snowfall before you've got your cold

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2 weather, then you've got a problem of driving the frost
3 into the ground to get your road depth. I've thought
4 about this occasionally myself just to, you know, if I
5 was on the spread and waiting for it to snow or to get
6 cold, which one I would pray comes first. I don't
7 think I've really resolved it. I mean that's a real
8 problem; but I think I would tend to go with the snow.
9 I'd like to see it snow first.

10 Q Now, I think maybe
11 ARctic Gas needs a great deal of prayer to get going as
12 early as they say. Have you in your evidence considered
13 the peatland south of Fort Simpson and the fact that it
14 needs quite a bit of freezing weather in order to be
15 firm enough to support the loads contemplated?

16 A Excuse me, I think I
17 missed the key word. Did you say "reroute?"

18 Q No, I'm speaking of the
19 peatland and the bogland south of Fort Simpson and
20 I'm wondering if you considered this when you arrived
21 at the figures that you've given in the environmental
22 statement.

23 A Yes, I certainly consider-
24 ed it. I didn't consider it in terms of the criteria.
25 I did consider it in terms of the number of days avail-
26 able. I realized that there is a problem in that area,
27 as far as the number of days available; but now even
28 that has changed in that their construction schedule
29 is different from the data I used to construct figure
30 6, which you referred to earlier.

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2 Q All right, and lastly in
3 rebuttal evidence Mr. Williams stated that-- I'm using
4 his words -- that "judicial route selection could
5 avoid problem areas in peatland." Do you regard that as
6 a practical solution, or do you feel that it's more
7 practical to wait for adequate freezing to occur?

8 A Well, I think it's
9 practical in the sense that I certainly would hope that
10 in routing the line that these sorts of problems were
11 considered. I think it would have been a mistake if
12 it hadn't been considered, and there's no doubt in my
13 mind, though, that they probably can't avoid those
14 conditions in all cases.

15 Q There are only so many
16 twists and turns that they could reasonably expect to
17 undertake on the pipeline route, aren't there?

18 A I think that's probably
19 fair.

20 MR. HOLLINGWORTH: O.K., those
21 are all the questions I have.

22 MR. SCOTT: It's 12:30, Mr.
23 Commissioner.

24 THE COMMISSIONER: Well yes,
25 we'll adjourn till two o'clock.

26 (PROCEEDINGS ADJOURNED TO 2 P.M.)
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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. HOLLINGWORTH: Mr. Commissioner, there is one point that arises that I neglected to follow up in cross-examination and with your permission I would like to ask that question of the panel. It relates to something that has been done, I think, ever since the beginning of the Inquiry, including the overview evidence. There was always a declaration of any affiliation at that time that any of the witnesses might have and my question to the Board is have any of them in the past, do they now, or are they contemplating or planning or to consult to Arctic Gas?

THE COMMISSIONER: Or Foothills, presumably.

MR. HOLLINGWORTH: Or Foothills. I know the answer to that.

THE COMMISSIONER: Well, just before we -- excuse me --

I suppose if they had acted as consultants to Arctic Gas in the past, that is something that we should know. If they are currently consultants to Arctic Gas I suppose we should know that, too. The last phrase, whether they are contemplating it, sounds a little --

MR. HOLLINGWORTH: Well, I think perhaps I should be a little more precise, sir, and that is --

MR. SCOTT: That would spoil their bargaining positions.

MR. HOLLINGWORTH: -- have they

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entered into arrangements to do so in the future.

THE COMMISSIONER: Oh, well,
that is all right. No objection to that, I take it? No
one represents the --

MR. SCOTT: What about Mr.
Templeton --

MR. MARSHALL: Their
counsel --

MR. HOLLINGWORTH: I am ex-
cluding the relationship of the Board to Canadian
Arctic Gas. I am talking about the members in their
individual right.

THE COMMISSIONER: Is that
all right with you, Mr. Templeton, or do you want to
comment on that?

WITNESS TEMPLETON: Yes, that
is quite all right. The Board itself is not, in my
opinion, a consultant to either, any of the people that
sponsored it. We never accepted that responsibility.

THE COMMISSIONER: Well, we
accept that. The connection with the Board is of no
consequence for purposes of this question.

A Or my company, Templeton
Engineering Company, or Interdisciplinary Systems of
which I am a principal, are not consulting to Canadian
Arctic Gas or Foothills now. Did you --

MR. HOLLINGWORTH: I am sorry,
I thought you had finished your answer and I was going
on to the rest of the members of the Board.

A And we have not done so

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since we did -- we did consulting for Alberta Gas
Trunkline early in the stage regarding problem
definition and a mathematical modeling of the regression
of permafrost, but that is the extent of our operation.

Q Dr. Adam?

WITNESS ADAM: No, I am not
a consultant for either and do not anticipate being.

Q Dr. McTaggart-Cowan?

WITNESS MCTAGGART-COWAN: No,
I am not consulting and I don't have any arrangements
to do so, and in the last part of your question you
said or for the government. I am Chairman of the
Canadian Environmental Advisory Council.

MR. HOLLINGWORTH: That was
Mr. Marshall's question, but thank you for answering
it.

Q Dr. Wilimovsky?

WITNESS WILIMOVSKY: No, I
haven't consulted for either. I have similar commitments
with the Canadian Government and to other national
governments, but not in connection with this Inquiry.

Q Mr. Craik?

WITNESS CRAIK: No.

Q Dr. Bliss?

WITNESS BLISS: Yes, and no,
I guess. It is a matter of interpretation. The first
week of the hearings I presented a general paper on
vegetation for counsel and next week I am to present
an environmental overview on the Delta, per se, for
I guess, technically it is the three companies who are

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presenting their overview at Inuvik. Now, that is a matter of interpretation.

THE COMMISSIONER: The producers, not Arctic Gas or Foothills anyway, but that is fine.

MR. HOLLINGWORTH: Mr. Gourdeau?

WITNESS GOURDEAU: No.

Q Professor Thomson?

A No, sir.

MR. HOLLINGWORTH: Thank you very much, gentlemen.

WITNESS TEMPLETON: Mr. Commissioner, maybe I should -- there was one thing that I probably forgot. The Department of Services and Supply of the Federal Government has asked our firm to do a very small study on -- it might have something to do with the pipeline to do with the management techniques, and I don't know whether the firm has the contract or not, but it was the federal government, but not the applicants.

THE COMMISSIONER: Well, let's keep our fingers crossed on that one.

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MR. MARSHALL: Sir, we're next.

CROSS-EXAMINATION BY MR. MARSHALL:

Q I'd like to continue with the cross-examination of Dr. Adam that I started last October and Mr. Carter will then cross-examine the other members of the Board pertaining to the subject of the living environment, but I think Dr. Adam wished to respond to a request you had made of him to check some information.

WITNESS ADAM: Thank you. Yes, Mr. Commissioner, yesterday I promised that I would review Mr. Parker's testimony and comment on it. I have done that. I think I would start by saying that it seems that Mr. Parker is indeed pessimistic about winter roads and I think it's because he has observed poorly constructed winter roads that have caused unnecessary damage. I think the main point that he made and as you made to me yesterday is that winter roads have not been operationally proven for pipeline work, and I would have to agree with that. Now, I could see getting around that somewhat, especially if I were in either of the applicants' position. I would have been interested now, but probably before now but there's probably even time now, providing they can find a pipeline that is being constructed somewhere, I would be interested in saying picking up the cost of the -- the difference in cost of say constructing 10 or 20 miles of pipeline off a winter road. Now whether that's possible or not

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sure. Now, on the other hand I maybe a little optimistic about winter roads and I'm sure this is because I've seen a couple of test roads and I've felt they were constructed properly. They were structurally sound and in the short term at least I did not observe any damage that I would even consider moderate. In addition, I've read several papers and reports where winter roads have performed well, where they have been constructed properly, and I have also read reports where damage was done but I felt that the roads were not constructed properly.

Now that to me is the significant difference in Mr. Parker's view and mine. It's basically whether the roads have been constructed properly or not. Now if they are not constructed properly, I am just as pessimistic about them as he is.

Now, just to give you my position, I would like to read I believe it's Exhibit 137, from Exhibit 137, chapter 2,

"Winter Roads Research Reports, Volume 4," E.P.B. September, 1974. That's the one we looked at earlier today. On page 35, if I could just read a paragraph?

THE COMMISSIONER: Yes, go ahead.

A This is under "Impacts predicted,"

"The predicted impact of the pipeline project resulting from winter roads has been based upon the concept of misuse and proper use. Misuse

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1
2 of winter roads results from beginning winter
3 road construction or use too early in the fall
4 or extending use too late in the spring. Misuse
5 also refers to continued use of a winter road
6 that has not been properly constructed or that
7 is in obvious need of repair. No matter the
8 cause, misuse of winter roads cannot be toler-
9 ated in permafrost regions since severe thaw
10 settlement and increased depth of thaw will
11 result from surface disturbance, in particular
12 in high ice content soils."

13 In addition to that I'd like to read on page 36, my
14 last three recommendations. With regard to pipeline
15 right-of-way and off right-of-way winter roads, it is
16 recommended that:

- 17 "1. Only compacted processed or ice-capped snow
18 roads and ice roads should be considered as
19 potentially adequate winter roads.
20 2. That auxiliary plans should be submitted for
21 all winter roads including snow haul roads the
22 year prior to anticipated use.
23 3. An adequate system of inspection and enforcement
24 should be devised to control the use and misuse
25 of winter roads."

26 I think that is all I have to say.
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THE COMMISSIONER: Thank you.

MR. HOLLINGWORTH: Mr. Commissioner, perhaps before Mr. Marshall commences, I have checked with my principals and established that their use of the words "winter road" and "snow road" are considered interchangeable.

MR. MARSHALL: Sir, that is not the way that Arctic Gas people have been using the term. My understanding has been that a winter road is a road of the type that has been used in winter construction areas, for example, in northern Alberta, where a blade is put down and the snow is scraped away, as opposed to a snow road, where one witness said, there is sort of a pavement built of snow and there is no disruption of the ground cover during the construction of the roads. So, they have attempted to differentiate between those two types of road, a snow road and a winter road.

THE COMMISSIONER: I don't think the occasions for misunderstanding were very many throughout the course of the testimony.

MR. MARSHALL: Dr. Adam, I have a question or two for you pertaining to thaw settlement. You made a statement in your evidence at volume 46 on June 2, found at page 6102. It is fairly brief and I will just quote it to you.

"For surface stability we decided that a moderate impact would occur when more than 5% of the length of any road or pipeline right-of-way undergoes noticeable settlement and a major impact would occur when more than

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5% of the length of any road or right-of-way settled to form depressions over two feet deep."

Do you recall that discussion?

WITNESS ADAM: Yes, I do.

Q What wasn't clear to me, sir, was how or why it was determined that this, and I am referring to the more than 5% of the length of the right-of-way settling to over two feet, why this would constitute a major impact and I wondered if you might expand on why it would represent a major impact environmentally?

A Well, I think that one of our concerns, and probably the major one is the interference of that type of settlement with cross-drainage and the channelization of water along the pipe. Also, aesthetics certainly come into it. I would have to think, though, that the channelization is probably the major consideration.

Q What about from an engineering point of view? Do you know if that would constitute a major engineering concern?

A Yes, it certainly would because it is just the beginning of the problem, the channelization. The result of channelization is erosion.

Q Well, I am looking at the bottom end of your scale here. You say:

"...and a major impact would occur when more than 5% of the length of any road or right-of-way settled to form depressions two feet

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deep."

Starting at that 5% figure you then have moved into your major impact category and it just seemed to me that that was a rather insignificant extent of depressions or settlements or ponding, to be categorized as a major impact, and I was wondering, when you are dealing with that end of the scale, what it was that caused you so much concern, either environmentally or from an engineering point of view?

A Well, you are certainly right on the ponding. I mean, you could get on any one section, 5% thaw settlement and end up with ponding and no channelization or no erosion. But I think I explained the last time I was here, that we did this on a regional basis and we didn't say that we were talking about any particular length. We were just talking about the region, and we're talking about 5% of the length of the right-of-way through that region. So you could end up with a few hundred feet of channelization, but we felt when you looked at the whole region that if you got above 5% in total that we felt that it was getting pretty serious.

Q Well, would it be fair to say that that is somewhat of an arbitrary yardstick? There is no particular significance to 5% as opposed to something else. You just decided that you wanted to draw the line somewhere.

A It is certainly a subjective judgment, but I would like you to realize that this judgment was made with the help of a full group of

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environmentalists and the person that came up with that recommendation was certainly challenged on it by others.

Q Can you think of any other environmental consequences other than the possibility of erosion due to channelization? I think you mentioned aesthetics. I don't know whether you consider that an environmental aspect.

A Well, I do -- I wouldn't want to say how important that is, myself, but offhand I think that the erosion is certainly the major one.

Q I was wondering, Dr. Adam, if in your view, the thaw settlement that you would expect on the part of a pipeline right-of-way that would be out of the influence of the chilled pipeline, that is, not the part that is under the influence of the pipe, say, in the centre, but say, the outer 40 feet on either side, on the extremes of the right-of-way, whether you would think that thaw settlement in that area would differ from that which you would find, say, on a seismic line, or for example, a line like the C.N.T. line?

A No, I think in general they would probably be similar. The only difference as I see it is, would occur from effect of the mound and the obstruction of water getting across the right-of-way in which case it may travel along the right-of-way on the upstream side and from that effect it might be somewhat worse than on seismic lines or the C.N.T. line.

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Q Would it be fair to say, sir, that thaw settlement problems on seismic lines and lines such as the C.N.T. line that has already taken place are really quite localized and far apart, in short, thaw settlement hasn't had a major impact on the terrain from the seismic lines and C.N.T. line?

A Again that's rather a subjective judgment, I would think because of the vast area that we're dealing with. It seems to me -- and I think this is verified by Strang's study in 1973 -- that the main problems resulting from disturbance in that area is from erosion and not thaw settlement, that is in the area -- well, the area south of where we recommend stopping chilling.

Q Mr. Adam, are you aware of any major erosional problem along these seismic lines?

A Pardon me?

Q Are you aware of any major erosional problem that have been identified along these seismic lines?

A Yes, there have been major erosion problems along some seismic lines. We have photographs and documentation of this in some areas.

Q Could you give some indication of the extent of the right-of-way that would be affected from your observations? Is this something that's localized or -- what I am getting to is --

A Do you mean localized --

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Q -- really this whole question of what's a major impact on terrain.

A Right.

Q And something effecting 5% of the length of the road of right-of-way settling two feet, it's really tying back to that question and I'm trying to find out what it is that makes you categorize something as "major".

A Well, I think one that I can recall offhand is one -- and this is getting out of the southern region -- it's just out of Inuvik and I believe it's along the C.N.T. line, and there there's quite a steep slope maybe four or 5% running for -- I'm just guessing -- at least a mile and maybe up to two or 2 1/2 miles long where there's a channel eroded out, it's maybe six or eight feet deep and would extend probably 15 to 20 feet at the top, and it runs for virtually the whole length of its slope and it's still proceeding upslope. When I looked at that I would certainly classify that as major.

MR. MARSHALL: Those are all the questions I have.

WITNESS TEMPLETON: Sorry, there's a --

THE COMMISSIONER: Go ahead.

A There's a pretty fundamental difference in the construction of a seismic line and the construction of a pipeline, and I don't think from a construction engineer's point of view

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1
2 they are similar at all. A seismic line goes along
3 with equipment so that it doesn't touch the surface.
4 It has shoes on the bulldozer and they knock the trees down
5 and the whole seismic operation is geared to not cutting
6 the surface. Now, a pipeline is inherently going to cut
7 the surface and it's going to dig up a ditch eight or
8 ten feet deep, and throw the mound of dirt up and the
9 there are a lot of operations that go along with that --
10 lowering the pipe in, welding it and hauling the pipe
11 so that it's a big operation in comparison to running
12 a bulldozer with some shoes on top the surface. So I
13 don't think the comparison of either the C.N.T. line,
14 which didn't disturb the surface much either, is -- I
15 don't think they're comparable.

16 MR. MARSHALL: I'd be the first
17 to agree with you, Mr. Templeton, that there are major
18 differences in the activities that go on, but evidence
19 has been led that with respect to the right-of-way, not
20 where the pipe is going to be but the balance of the
21 right-of-way, that it's not intended that the trees are
22 going to be ripped off. They'll be cut off above ground
23 level and it's intended that construction is going to
24 proceed using snow roads and naturally where the ditch
25 goes there's going to be complete disturbance when
26 the pipe is inserted, but then there is a mound over that
27 area as well, and revegetation.

28 A Yes, there's a mound, but
29 that mound causes chanelization of water and then when
30 the backfill, which is frozen, when you put it back in

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Cross-Exam by Carter

1
2 that settles, it doesn't settle evenly so that you end
3 up with a nice smooth operation, and the very fact that
4 you've got that many men kicking around with all the
5 equipment that they have indicates that they're going
6 to do a lot of things that they're not supposed to do
7 and that that right-of-way is going to have a pretty
8 severe treatment.

MR. MARSHALL:

9 Not if you have your way,
10 Mr. Templeton. Thank you, sir.

11
12 CROSS-EXAMINATION BY MR. CARTER:

13 Q Dr. Bliss, if I could
14 start with you. Evidence was given on revegetation by
15 Mr. Dabbs for Arctic Gas, and Dr. Vaartnou for Foothills.
16 Are you familiar with that evidence?

17 WITNESS BLISS: Yes sir, I am.

18 Q And briefly, as I under-
19 stood it, Dr. Vaartnou intended to use in his revege-
20 tation native species and what he called naturalized
21 land races, and Dr. Dabbs on the other hand was confi-
22 dent about his approach and was going to use agronomics
23 principally with some use of the native species. I'm
24 wondering if you with your background could comment on
25 those two different approaches?

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A In part, I guess it is because the environmental regimes of the two projects are somewhat different. In turn, the backgrounds of the people are somewhat different and I think because of the combination of these things, the approaches or the emphasis has appeared a bit different. Let me briefly explain.

Mr. Dabbs and his people have been looking at revegetation from Prudhoe Bay to Alberta from wet sedge tundra through tussock tundra to shrub tundra to forest tundra to forests. Each of those units has a somewhat different climate, soil relationship and the potentiality for revegetation, and as a result of that, especially in the tundra portion, Mr. Dabbs and his people have concentrated on those species that they believe will do best within a tundra environment. This put the emphasis on two native species, species which take one or two years to become established, to begin to put on much top growth and root growth. Knowing that, they then worked with a group of species and we at the university initiated a good bit of the total research in this manner, had then to work with a group of species, agronomics, if you will, but northern populations of agronomics that were adapted at least to northern forest regions, species that we knew would grow well for one to three years and establish a relatively rapid plant cover within the tundra. So, it is a combination, the two species best adapted, the two natives are good on the long haul, but they are not good the first year or so. Therefore, they had to be married with

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the best plants available to give a good early cover.

It so happens those are agronomics. So that, I think ,
is the one situation. Within the forest there are many
more species, both native and agronomic that can do the
job, so it becomes somewhat of an academic question
as to which you use.

Q And it depends, I suppose,
does it, on your ability to produce, particularly the
native species --

A Precisely --

Q -- sufficient seed.

A And it was for this
reason that Arctic Gas on their own as well as on our
urging and because of this early research that began in
1970 rapidly recognized that if we were going to --
not we -- if the pipeline consortium, CAGSL, was going
to reseed with native species, the very first and most
fundamental question was, is there available seed, and
therefore, the need to launch into such a program.

A Dr. Cowan, if I could
turn to you, in your discussion yesterday of the
Interior Route and the Coastal Route -- well, firstly
you mentioned the Fairbanks corridor and stated that you
would prefer that overall, am I correct?

WITNESS MCTAGGART-COWAN: Yes,
on the basis of what knowledge has become available.

Q Yes. In coming to that
conclusion, did you consider that the Fairbanks Route
would have a leg coming down from the Delta?

A Would have a leg, you mean

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up the Dempster --

Q Yes.

A -- or somewhere else?

Q For the Delta gas, or
were you considering that that would go out, up the
Mackenzie Valley.

A Well, I considered two
alternatives. I think that the Commissioner at one
time stated that, in the Whitehorse hearings, as I
remember, that when he was referring to the Fairbanks
route he was not including the Dempster. I think that
was the statement.

I have been concerned about
the total issue. I did consider in the total issue the
possibility of having to bring the Delta gas or whatever
up the Dempster, yes.

Q And if that was the case,
would you still prefer the Fairbanks corridor?

A Yes, I would.

Q Now, considering the
Dempster for a moment, you stated, I believe yesterday,
that the Yukon would require a game management program
as a result of the pipeline, is that right?

A It has a game management
program now, sir.

Q An expansion.

A It would require an
expansion. In fact, I stated this in the evidence when
we were here in June and that was cited again this
morning.

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Q Right. Would you say that that is required now with the Dempster Highway.

A Yes, I would.

Q -- in spite of the pipeline?

A Yes.

Q Could I refer you, sir, to your code --

A Yes.

Q -- Volume II. The section is 14.6 on page 9. Now, the first part there I understand that you have now modified that so that there is no distinction and you'd apply the 2,000 foot level wherever?

A Yes, I think that's the margin of safety that is needed at this stage.

Q Right. The last sentence in that section is as follows:

"Overflights of caribou herds shall be prohibited during the month of July."

What is the basis for that requirement?

A This is the period when the herds are gathered into -- when the caribou are gathered into very large herds and are under very severe assault by bot flies, by warble flies, by mosquitoes and they seem to be extremely susceptible to disturbance at this time. It is the one period of the year when all the young and their mothers are together in very large groups. In other words, you can make a greater impact on more caribou quicker at this time, and because they are all together, it is the easiest

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time to avoid flying over them.

Q Now, I am wondering
if -- this is a period of the aggregation of the caribou
herd --

A Yes.

Q Would it not be more
advisable to have your code stipulate that, in other
words, rather than saying the month of July that
no overflights --

A While aggregated.

Q Yes.

A I would accept that, yes.

Q I suppose there is a
possibility that it might happen on June 30th.

A Or it could happen on June
30th, surely. You have got a good point.

Q Now, in response to Mr.
Veale this morning, you referred to a number of points
that you had considered the coastal route versus the
Interior route and one of these was, and I am not
sure if you mentioned that this morning, but at least
yesterday, was the Dall sheep and you said that there
was little between the two routes, vis a vis the Dall
sheep.

Now, if you are looking at it
from the point of view of the new Prime Route, that is,
the cross-delta route, I take it then that route would
avoid Dall sheep altogether so that you'd have a
preference there with respect to Dall sheep.--

A You would have a slight

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preference there with respect to Dall sheep because it wouldn't -- the avoidance of the sheep would make it unnecessary to assume other standards of performance while in contact with the sheep.

Q Right. One of the other areas that you stated was in the balance, didn't make one route preferable over the other, was the grizzly bear. I am advised that the grizzlies are more numerous in the mountain area than in the coastal area, is that --

THE COMMISSIONER: I am sorry, I couldn't hear you, Mr. Carter. Grizzlies are more numerous where?

MR. CARTER: In the mountain area.

THE COMMISSIONER: Yes.

MR. CARTER: That would mean that the Interior Route would be more likely to encounter grizzlies, there are more grizzlies in that area than along the coast.

A I made the point yesterday that they were more numerous in the Interior than on the coast. You will find that in my testimony, and I think that I was misinterpreting an article that came out in your volume, CAGSL's volume 32 describing --

Q This is the Biological Report Series?

A This is the Biological Report Series, describing the work done this summer and last year, the two previous years on the marking of

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grizzly bears, radio marking and otherwise marking
them so that they can be observed. One of the diagrams
in there I interpreted as showing that there were
six grizzly ranges intersecting the Canning River
-- now, this is in Alaska and I don't know whether you
are talking about Alaska or Canada.

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Q Yes. Both Alaska and Canada.

A I understand now that that was only meant to refer to those which they had marked, carrying radios, and that there actually are more, perhaps as many as 30 ranges that intersect that area. It would be extremely interesting to have the same kind of data for the coastal route, but it hasn't been available to us yet. But you're quite right. As I said yesterday, there are more bears in the interior than there are on the coast. The extent to which there are more I don't know.

Q Now, one of the other items I believe was fur-bearers, and again you stated that there wasn't -- there was no choice to be made one over the other. Again I'm advised with respect to fur-bearers that there's a greater variety of fur-bearers on the interior route than on the coastal route. Is that true?

A Yes. The question is if you're not doing any - if you're not having any impact on 12 or 6, does it matter?

Q Well, are you saying there would be no impact?

A Well, if you want me to go down the line on the fur-bearers, you know there are certain things that are rather interesting. I can foresee that the change in the plant vegetation of the revegetated route will increase the number of microtis--
that's a

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THE COMMISSIONER: That's a what?

A A small brown field mouse
that favors grass-like vegetation, and this would
probably increase temporarily anyway down the pipeline
revegetated route. This is apt to attract weasels, which
are the normal predators of those, and also martin,
if you're in martin territory, which you would be in the
interior but probably not on the coast. So that you
might get a temporary concentration, you might even
get a slight improvement in the population of weasels
and martin. On the other hand you might not. You might
merely concentrate them and make them more available
to any trapper who decided that the revegetated pipeline
route was a good route to follow in his trapline.

 The point that I had in mind
was that the area covered by these fur-bearers is very
large. The proportion of the area ^{altered} substantially
by the pipeline is relatively small, another point
which we made early on, and that I could see damage to
wolverines if proper regulations are not imposed on
the pipeline workers, and proper handling of garbage and
so on. I could see damage occurring to wolves on either
route. Already along the Alaska Pipeline route it has
been found impossible to prevent people from making
pets of wolves. They stop their truck, there's wolves
alongside the road, they give them some of their lunch
and before very long the wolf is running the highway
and this kind of thing is going to take place in either
route, but if we don't have a road it will take place

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2 for a relatively short period of time.

3 MR. CARTER:

4 Q It's an important distinction.

5 A It's an important distinction,
6 exactly. So when I came to weigh it all up I
7 couldn't see any substantial alteration in the total
8 population of martin, weasels, squirrels, red foxes,
9 you know.

10 Q I see.

11 A On either route.

12 THE COMMISSIONER: What about
13 the impact on muskrat say in Old Crow Flats? That's a
14 muskrat hunting area of some sort.

15 A Yes, it's a muskrat hunting
16 area, sir. So also is the Mackenzie Delta. My
17 own personal experience has been devoted to the Mackenzie
18 Delta rats. I spent quite a bit of time studying muskrats.
19 I'm not familiar with the kinds of silts that
20 I gather constitute the Old Crow Basin area. I gather
21 that it's an old fossil sink with very fine silts in it.
22 Muskrat populations depend upon the density of marsh
23 vegetation and submerged vegetation which they use for
24 their food, and the availability of suitable areas for
25 building their dens or pushups, and on the depths of
26 water the areas of water deep enough so that it doesn't
27 freeze to the bottom in wintertime, and it is conceivable
28 that ill-considered construction could drain certain
29 lakes that are quite productive, or so lower the water
30 level that the thing would freeze to the bottom,

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2 thereby freeze out the muskrat population that otherwise
3 would be there. Some of these large shallow lakes with
4 an abundance of sedge vegetation and pond weeds
5 in the water are very productive. So this is a potential.
6 I can't conceive of the numbers of them being very large
7 when you're talking about tens of thousands of pelts
8 harvested but it could happen if the construction was
9 done in an ill-advised way, either in the Mackenzie
10 Delta or in the Old Crow Flats.

11 THE COMMISSIONER: You know
12 the native villages in the delta and Old Crow, the mus-
13 krats certainly appear to be by far the most important
14 fur-bearer.

15 A Yes, they are, sir.

16 Q And I just wanted to be
17 sure that in indicating that you felt there was not
18 going to be any likely damage to any great extent to
19 the fur-bearers you were including the muskrats. You
20 put that to one side, and that's essentially the
21 position you take.

22 A Again, assuming that the
23 construction is -- the pipeline routing is so designed
24 that it doesn't intersect --

25 Q If they somehow manage
26 to drain the Mackenzie Delta, we have to revise our
27 whole outlook on it.

28 A The muskrat population of
29 the Mackenzie Delta used to, when I was working there
30 some time ago, produce half a million dollars a year

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2 for the native people of the Mackenzie Delta, and that
3 was a very substantial part of their annual income of
4 those people. Not only that, muskrats were very good
5 eating and I can personally testify to that, and it's
6 a good meat resource. So that the muskrat is a very
7 important species of fur, so is the beaver in the whole
8 Mackenzie Delta -- Mackenzie River area.

9 Construction fuel spills of
10 course is another thing we haven't referred to. If you
11 get fuel oils, particularly heavy oils, the light oils
12 in my experience have little impact on muskrats. So
13 far back in my dim past that I don't even like to remem-
14 ber it I was a mosquito control officer in one part of
15 Central British Columbia, and we used light oils for
16 mosquito control, purposely spreading it on the water.
17 It was just as successful as D.D.T. and far less damaging
18 to the environment. But it's gone out of style.

19 Q Excuse me, just this
20 muskrat thing. In all the villages I went to they were
21 very, very concerned about the muskrat, almost as
22 concerned as they were about the caribou. You're
23 really saying that the habitat in the Old Crow Flats
24 is such a vast habitat, so is the Mackenzie Delta, that
25 the construction project across the flats or the delta,
26 whichever route they take, is going to leave, given any
27 kind of prudent construction, is going to leave the
28 -- by far the greatest part of the habitat undisturbed.

29 A That would be my claim,
30 yes. I can understand their concern about it because it

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2 is a major resource both for food and for fur. We have
3 to bear in mind, too, that one of the accepted techniques
4 for marsh improvement for muskrats further south is
5 blasting, blasting out great channels to deepen the
6 water and to increase the edge.

7 Q I'm sorry, that would
8 improve the habitat?

9 A It does in the south but
10 I don't think it would be an acceptable technique in the
11 north.

12 Q By "the south" you mean
13 Southern Canada?

14 A Southern Canada, yes.

15 MR. CARTER: Q Dr. Cowan, you
16 mentioned Old Crow as well in your testimony in June
17 with respect to the caribou herd, and stated that
18 it was really the only settlement that was within the
19 range of the caribou herd.
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It was at page 6202. Now you said that the other settlements such as Aklavik were on the periphery and they hunted from there, but that Old Crow was in the range.

A Yes, if you want to refer to all the native villages that use it, of course, there is McPherson and Aklavik and Kaktovik and Arctic Village and Old Crow. These are the people that use that as their animal food resource.

Q Now, to continue with my next question, that there are other villages particularly in Alaska --

A Right.

Q -- that make use of the Porcupine caribou herd.

A Yes.

Q So that -- and it has had contact with man, the native people from these villages, and in response to Mr. Veale's question, you stated that the Porcupine herd was there because it had relatively little contact with man, as you admit, has been in contact with man.

A Oh, yes, there's been several thousands of animals taken out of it for quite a number of years, we don't know how far back, annually.

Q And it is my understanding that historically there was considerable contact along the coast with the whalers who took ^a considerable amount of caribou and in fact we bought caribou from the native people.

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A Yes, the likely, the historical evidence that I looked at some years ago and I haven't refreshed my mind on it, suggests that this was in very large measure responsible for the virtual elimination of the caribou within easy reach of the Mackenzie Delta.

Q Yes. Stephenson--

A When the Anderson expedition wintered in the Mackenzie, Anderson was on a side trip through the winter which is well documented in the accounts and they very nearly starved to death due to the absence of caribou.

Now, it is awfully easy to blame, say, "Look, this is the cause for that and it is way back in history and we have no way of gaining the facts", but there was coincident change in numbers.

Q That would be heavy hunting would have caused that.

A Could have.

Q Now, also along the coast there were the whalers, historically; there has been the DEW line sites along the coast.

A Yes, two of them, I think, are there not? There were three at one time, one has been abandoned for some time.

Q In Canada?

A Yes.

Q And also sites along the coast in Alaska.

A Mm-hmm.

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Q So that there has been
some disturbance there already.

A Yes, there have been
people on the North Slope.

Q And landing strips at these
sites?

A Yes.

Q Would you recommend that
any landing strips constructed be off limits to the
general public so as to cut down on the accessibility?

A Yes.

Q That, to you, is a major
problem of the herd, is the accessibility?

A Yes. But accessibility
to everybody,

Q Yes.

A Not just people coming in
from outside.

Q Including native people?

A Right.

Q Yes.

A I mean, if this is a
management problem, which it will be, everybody is in-
volved in the management problem, all those people who
use the herd are involved and must be conversant with
the regulations, must accept the regulations, and must
abide by the regulations once they have been agreed
to.

Q Now, Mr. Gourdeau, if
I could ask you a question related to Old Crow, bearing

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in mind that the Interior Route crosses the Yukon quite close to Old Crow, and that the coastal route, particularly now with the amendment, the cross-delta amendment, would not pass close to any native villages in Canada, or as close at least as Old Crow, what is your preference between these two routes?

THE COMMISSIONER: Excuse me a minute. You are asking Mr. Gourdeau if his preference is between the new route across the delta and the interior route?

MR. CARTER: Well, the new Prime Route, the new coastal route, sir, including the cross-delta.

THE COMMISSIONER: The new Prime Route.

MR. CARTER: Yes, sir.

THE COMMISSIONER: Against the interior.

MR. CARTER: That is correct.

THE COMMISSIONER: And you are saying that there was an assumption in there that I didn't want to slip by me.

MR. CARTER: Well, the Interior Route crosses the Yukon and is fairly close to Old Crow, is that your understanding?

THE COMMISSIONER: And McPherson.

MR. CARTER: Yes, yes.

THE COMMISSIONER: And Arctic

Red.

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MR. CARTER: Yes.

THE COMMISSIONER: All right,
now you say the new one --

MR. CARTER: Doesn't come close
to any of those. Is that fair ?

WITNESS GOURDEAU: Well, it is
fair, but you --

THE COMMISSIONER: Excuse me
a minute, just before we -- this is sort of anticipating
evidence
the next two months/in Inuvik, but we don't have that
map on the wall, but that new route across the delta
while it doesn't go anywhere near the village of
Tuktoyaktuk, is certainly going to be of great concern
to the people of Tuktoyaktuk, I should think. No, no,
I guess you are right, it doesn't really go -- it is not
in proximity to any village in the way that the interior
route is in proximity to Old Crow.

MR. CARTER: Nor the old
prime route where it came down the side.

THE COMMISSIONER: By
Aklavik.

MR. CARTER: -- near
Aklavik.

THE COMMISSIONER: Sorry, I
just wanted to acclimatize myself before you go on.

MR. CARTER: One could say
sir, that Tuk had the influence of the leg from Richard's
Island before.

THE COMMISSIONER: It still
has.

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MR. CARTER: Yes.

THE COMMISSIONER: Yes, right.

MR. SCOTT: I take it, Mr.

Commissioner, that Mr. Carter is leaving open the possibility that a route might have maximum, or might have a major impact on a community, even though it doesn't pass immediately next to it. In other words, one can imagine that the new cross-delta route might have greater impact on Aklavik than perhaps even the old one, though one is closer to the community than the other.

MR. CARTER: I intend to ask Mr. Courdeau the question and he can say what his opinion is.

MR. SCOTT: I thought the question was being set up by this comparison.

A Well, I don't think I can answer that question because I don't know. I don't know what would constitute the better impact on the people or the worst impact on the people among the following things, because I am not a native guy and they have some people to express their concerns and their preference in everything.

For me, supposing there is a settlement of the land claims, the attitude of the native people could very well be that in the case of certain villages they would prefer to have the pipeline not too far from their village because of the possibility for them to have gas and low price heating and things

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like that. They could even, if they were assured that the animals, the populations of animals would not be even seriously affected, /if it was more affected in the place than in another, if it was not significantly affected, that they would say, "Well, as long as it recovers after three or five years and our land claims is settled and we can have the gas to heat our houses and we can profit by certain jobs along with our customs and taking into account our requirements, family requirements and everything, it could very well be that their choice would be different, you know.

So, I don't know really, what is best for the villages, for the pipeline to pass rather close to their village or to be completely away from their village.

THE COMMISSIONER: Mr. Carter, the point you were trying to make, I take it, is that the social impact of this new prime route is likely to be less than that of the Interior Route, is that --

MR. CARTER: Well, sir, I am not making any argument for myself. I heard from the panel members their views on the Interior Route over the Coastal Route and we didn't hear from Mr. Gourdeau and I prefaced my question to him with a discussion of the Interior Route passing near Old Crow and the other villages and the new prime route did not.

A So my answer is there, really, if you look at the social impact, it depends on so many things. It does not depend only on the fact that it would pass very close to a habitat or not. I don't think

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so, that it will depend only on that. There could be some other consideration that will be more important and now if you asked my preference I think that maybe it is because those that defended that point of view within our Board had an argument that struck me more than the others, I think that I prefer the Interior Route if the Old Crow Flats can be completely avoided, and I understand that maybe if the route proposed by Calef or something like that could avoid the Old Crow Flats, maybe this could be the best one if you -- not if you consider only the people, the social impact, but if you consider all the environmental concerns including the people .

Q Do you have a view if it is not possible to take the southerly route proposed by Calef?

A I don't have a view on this except that nobody has -- I am a layman in many of these things and in biology, although I am a forester, I can understand a little bit their language, and I can make an idea out of this, but we never had, I think, enough studies made on this to prove anything to us, but nobody said that it could not be done or it was bad and give us the reason why it was.

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Q Dr. Cowan, something that
wasn't clear to me, I believe it was yesterday the
Commissioner in a question to you asked you about your
opinion that you preferred the interior route, and the
question suggested that your opinion is the Board's
opinion. Is that right?

WITNESS McTAGGART-COWAN: It's
not the case, no. There's more than one opinion
within the Board.

Q My understanding is that
Dr. Bliss and Dr. Thomson have made a pretty rough run
at it and come out slightly in favor of the coastal
route; and Dr. Wilimovsky prefers the coastal route
from the point of fish, you prefer the interior route.
Mr. Templeton slightly prefers the coastal route and
-- No?

A No.

Q All right, what's your
position?

A I think that I could use
the same technique, technical approach that Dr. Thomson
and Bliss have been playing with, it's still at a very
early experimental stage and I don't know whether I'd
come up with the same answers as they did or not. It
depends on the subjective weighting of what you put in.
When you start adding up things you add up your own
estimates. You build in your biases, give them a
quantitative value.

Q Mr. Templeton?

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WITNESS TEMPLETON: Well I

think you've got the problem, one of the problems we have is we're interested in the environment, and the environment includes Alaska as well as Canada, and we haven't had enough information, in my opinion, on it. We've heard their problems in Alaska. I haven't really been sold on that entirely, and so this is one of the real problems you have of making an adequate comparison between those two groups, and that's the reason that we didn't come out very clearly in our report and say it. But if you could avoid the Old Crow Village and the Old Crow Flats, as was suggested a number of times, including the famous meeting in April, '73, and also reduce the going through the Richardson Mountains, this is pretty -- it's a wilderness area that is fairly unique and something to be preserved. I'd be inclined to favor the -- as far as Canada is concerned there's no question in my mind that I'd prefer the interior route. Now if you add the Alaska problem, environmental problem into it, it reduces it but I don't know how much.

Q And if you assume that the more southerly interior route is not possible, considering both Canada and Alaska, where does it come out?

A Well, I think it is possible but --

Q I ask you to assume it is not.

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2 A I'd still take the interior
3 route.

4 Q And hope for the more
5 southerly.

6 A Yes, I'd want it to be
7 proven that the more southerly route couldn't be done.

8 THE COMMISSIONER: Fairbanks, you mean?

9 A No , no, this is --

10 MR.CARTER: Dr. Calef's suggestion.

11 A -- Dr. Calef's.

12 MR. CARTER: I have no more
13 questions.

14 WITNESS CRAIK: Mr. Carter, I
15 wonder if I could just add a comment as a member of the
16 Board and not necessarily as a specialist in the field
17 of expressing an opinion on the route selection. I
18 think Mr. Veale's comments this morning were very
19 important and they're the ones that have plagued trying
20 to make a decision on coastal versus interior route,
21 and that is the unknowns, what happens in future
22 development, and one of the difficulties is that in
23 starting out to look at this question we were looking
24 pretty well exclusively at a gas pipeline. But then as
25 you go along you have to ask the questions which are
26 really the unknowns, that is, is this going to provide
27 for an oil pipeline? Is it going to provide as Mr.
28 Commissioner pointed out, for the corridor indicated
29 in the guidelines? Now if we assume that the gas line
30 means the corridor with oil line and highway, if that's

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2 the real concern about the coast, more so than on the
3 interior, I think then in making the selection for a
4 gas line alone is quite part from the arithmetic sum
5 of the impacts on all the disciplines that have looked
6 at this, that these over-riding considerations, the
7 corridor consideration, then the great unknown of where
8 the future discoveries are going to be. Now if -- the
9 problem we've always fought with in arriving at the
10 interior route is if there are major discoveries in the
11 Beaufort, and we've never yet, as has been indicated,
12 been able to get any sort of assisting type of information
13 on the potential of the offshore discoveries. Perhaps
14 it's not available. But if they did occur, then you then
15 had to take your product and assuming society is going
16 to demand that that product be taken out of there and
17 taken south, then of course all you're doing is by
18 opting for the interior route is making sure that you've
19 had an environmental impact on both the interior and
20 the coastal. So that the dilemma you're faced with is
21 the important information you need, is to us basically
22 unknown.

23 THE COMMISSIONER: Well, that's
24 really a very difficult picture to, so to speak, try to
25 pencil in, but we've asked the producers to bring
26 forward evidence in Inuvik indicating the trend of
27 discoveries and so forth, insofar as it is possible
28 ever to know what is likely to occur, they should be
29 in a position to do so. We should be, that is the
30 Inquiry, and since we are doing our work a few years

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Cross-Exam by Scott

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2 after you people did yours, take advantage of not only
3 what you did but of what has been discovered in the
4 intervening period.

5 Well, we'll adjourn for --
6 you've finished, have you?

7 A Yes sir.

8 THE COMMISSIONER: We'll adjourn
9 for coffee then.

10 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

11 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

12
13 CROSS-EXAMINATION BY MR. SCOTT:

14 Q Dr. Templeton and gentlemen,
15 I have a number of sort of unconnected questions, and
16 I'll refer them to Mr. Templeton.

17 THE COMMISSIONER: Well, excuse
18 me, Mr. Scott. Dr. McTaggart-Cowan said he had some-
19 thing he wished to add.

20 MR. SCOTT: Oh, by all means.

21 WITNESS MCTAGGART-COWAN: If
22 I may, Mr. Scott?

23 MR. SCOTT: Certainly.

24 A I, in conversation during
25 the coffee break, it appears that I may have left a
26 misapprehension in my -- when I mentioned the use of
27 light oil for mosquito control. I'd like it as a matter
28 on record that I think the introduction of an oil spill
29 into either the Old Crow area or the Mackenzie Delta
30 or the Ramparts River area, the other muskrat areas,

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2 would be -- could be a major disaster. The extent of the
3 disaster would depend on whether the river was in spate
4 there was in
or whether/the delta heavy on-shore winds since I was
5 working up the Peel River some years ago on muskrats,
6 and after a week of heavy onshore winds, the surface
7 water of the Mac kenzie was running upstream at about
8 a knot and it flooded, took muddy water into lakes that
9 were otherwise clear and were good muskrat producers,
10 this, if it was covered with oil, could have flooded
11 huge areas of the delta with oil. So I would like that
12 to be a matter of record. I am very concerned about the
13 potential for oil spill damage to muskrats, wherever
14 it occurs. Thank you.

15 Q Though my questions might
16 be directed to Mr. Templeton but I hope that any member
17 of the panel who wants to either add to or correct what
18 he said will feel free to jump right in and do so.

19 First of all, M r. Templeton,
20 we seem to envisage this project as one in which a
21 pipeline will be constructed over a two or three-year
22 time frame, and then in some fashion the terrain will
23 through the passage of time be restored to what it was,
24 and it's in that context, I suppose, that Dr. Cowan
25 refers to the fact that he's not much alarmed about
26 the possibility that the construction of a pipeline,
27 when it's been buried over and revegetated, will impede
28 caribou. But I'd like to ask you and the other members
29 of the panel to consider the whole project in terms of
30 its cumulative effect, bearing in mind that we have an

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2 admission from the applicant that looping will take
3 place, I think within five years, or will likely take
4 place.

5 MR. HOLLINGWORTH: First of all
6 Sir, there are two applicants ^{here} and Foothills has never
7 said anything of the sort. In the second place, I
8 think Mr. Marshall will probably correct that statement.

9 MR. SCOTT: Yes, I'm sorry.
10 Foothills hasn't conceded that there will be any
11 looping. We have Mr. Horte's evidence about looping.

12 THE COMMISSIONER: That related
13 to the main line.

14 MR. SCOTT: That relates to
15 the main line and not the line that runs from the
16 delta to Alaska.

17 MR. MARSHALL: I think --

18 MR. SCOTT: Is there any doubt
19 about that, Mr. Marshall?

20 MR. MARSHALL: I guess I don't
21 need to admit there are two applicants.

22 With respect to the comment on
23 looping, various counsel have picked it up and appraised
24 it various ways, and I don't think the way it was just
25 put was accurate. I think Mr. Horte was asked whether
26 there was a possibility, and he said, "Yes, it's a
27 possibility." He was asked to state, I think, his most
28 optimistic guestimate, if you like, as to when it might
29 take place and he did so.

30 THE COMMISSIONER: Well, let's

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-- let me put it this way because we can go back to the record and see what Mr. Horte said if it comes to that -- I thought he was being fair and frank with the Inquiry, and my impression was that he was saying that it was the intention of Arctic Gas -- no, I don't think he said "the intention"; he said it would likely be looped within five years after completion of the construction of the main, the original gas pipeline, and he went into that in great detail. He was examined for two or three days on looping, Mr. Marshall, and my impression is that he put it a good deal higher than a possibility. You know, we're all certainly governed by the record, but I think you will find that he used the word "likely", which in my view is very much more than a possibility. So we might go back to the record, we'll have to anyway, and I think that was the impression he gave me.

MR. MARSHALL: I think, sir,
on it.
you're right, we'll have to check the record/ My understanding was that he said, "Yes, it would likely be looped, every pipeline that has been built has been looped and it's likely this one will be looped as well," and the point of departure is deciding when it will likely be looped. I'll check that.

THE COMMISSIONER: You might check it. Just pausing for a moment on this issue, the two pipelines, one from Prudhoe Bay and the other from the Delta that join near Travaillant Lake to form the main line, at that time, the time he was giving his answers I think had twice the capacity of the

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2 main line, so the notion of looping the main line seemed
3 the perfectly logical
4 /thing to do, given the volumes that could be carried in the two
5 supply legs, one from Prudhoe Bay and the other from
6 the delta. But he did not say that there was any
7 likelihood that he could see at the moment of the
8 Prudhoe Bay supply leg being looped, and that's a matter
9 of very great importance, given conditions on the
10 North Slope.

11 MR. SCOTT: I'd like to congrat-
12 ulate Mr. Hollingworth for beating Mr. Marshall to the first
13 objection in my cross-examination. But perhaps I can
14 put the question --

15 MR. HOLLINGWORTH: By the way,
16 while I'm being given credit, Mr. Commissioner, I would
17 disagree with Mr. Marshall's proposition that every pipe-
18 line ever built has been looped.

19 MR. SCOTT: Well, gentlemen of the
20 panel, let me ask you to assume whether it be true or
21 not that the pipeline from the delta to the Alberta
22 border will be looped five years after the operation of
23 the present project. The reason I ask you to assume
24 that is that it seems to me it would be a tragic misuse
25 of your abilities if no one ever asked you about what
26 might happen on a scenario that is regarded, if not a
27 sure thing at one end, at least a major prospect on the
28 other, and so I think it would be too bad if you left
29 here without commenting on the eventuality that seems
30 to be certainly within the realm of possibility.

Now first of all, Mr. Templeton,

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2 I take it that you say at page 6445 -- and I'm
3 summarizing -- that looping will increase the time
4 span of certain types of disturbance, is that the
5 first thing?

6 WITNESS TEMPLETON: Yes.

7 Q And secondly, that it
8 may convert what would otherwise be minor impacts into
9 major ones.

10 A Yes.

11 Q Anybody disagree with any
12 of that? Well now, what I draw from that, Mr. Templeton,
13 is that the time interval between the original line and
14 looping may be an important element related to environ-
15 mental impact.

16 A Absolutely.

17 Q All right. Indeed, the
18 time interval may in cases be as important a factor as
19 the nature of parts of the development itself.

20 A Yes.

21 Q Now, can you --

22 THE COMMISSIONER: You mean the
23 interval between original construction?

24 MR. SCOTT: Yes.

25 Q And in that context are
26 any of the members of the panel able to be specific
27 or point to specific areas in which impacts might be
28 changed from minor to major, or where impacts are
29 susceptible to a timing factor when the loop is going to
30 occur on the premise I give you, five years after

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2 construction. On that scenario, what is this going to
3 mean in terms of the impacts within your discipline
4 which you've discussed for us?

5 A We could start with the
6 terrain and then I'll pass it over to the ecologists.
7 If you are to cause these mounds to be built, as we
8 discussed earlier this afternoon, from the throwing the
9 material up and the disruption of drainage and you
10 went alongside that a few years later, you might change
11 the wetland habitat downstream or cause more siltation
12 or things like that. Perhaps Dr. McTaggart-Cowan could
13 talk about animals.
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1 WITNESS MCTAGGART-COWAN: I find
2 it difficult to be site specific, Mr. Scott. The
3 areas that I would have particular concern about would
4 be the wetland areas in the Ramparts River area, the
5 continuing disturbance effect where the migrating geese
6 and swans pause to rest on the northbound route. The
7 impact on large mammals would be dependent upon what
8 populations were interfaced by this continuous disturbance
9 which it would amount to over a period of time.

10 One of the possibilities that
11 we have to look to is that the major caribou herds of
12 northern Canada seem at this time to be on an increasing
13 phase, the Bluenose herd, the Bathurst herd and so on
14 seem to be increasing. With this in mind it is possible
15 that we will see caribou back in the Mackenzie again,
16 the Mackenzie Valley again, and if they are there they
17 may be moving back and forwards across it and if this
18 is so, the continual disturbance of the pipeline
19 route would be a major impact, or could be a major
20 impact.

21 Now, this is a scenario that
22 has got several assumptions in it, but you asked for
23 a scenario.

24 Q Well, basically what I
25 am looking to is, and it may be impossible to provide it,
26 is that are the panelists able to give us areas of concern
27 that we should look at carefully bearing in mind that
28 we are talking not about one project on my scenario, but
29 either one and a half or two depending on how you
30 weight the loop.

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1 A You won't include an
2 oil pipeline in it.

3 Q Well, there is an additional
4 factor of course and perhaps we can get to that. Mr.
5 Templeton, you would agree that timing between this
6 project and any succeeding project, such as oil
7 pipeline, highway, railway, and so on, may be significant
8 in terms of measuring impact.

9 WITNESS TEMPLETON: Yes.

10 Q Has the Board or any
11 individual members given any consideration which
12 they can help us as to the timing. The Commissioner
13 has to make recommendations. It may be suggested to
14 him that he should make recommendations with respect
15 to timing of loops or other projects. What would you
16 have him say about those matters? If anything?

17 A Well, I think that --

18 Q Dr. Bliss was nodding
19 his head and I won't forget you, Mr. Templeton, but
20 perhaps he can.

21
22
23 THE COMMISSIONER: Well, just
24 before anyone does, could I just add something to Mr.
25 Scott's question. You have got the -- take the Arctic
26 Gas project. Leave Foothills out of it for the
27 moment. They have these two supply legs, one from
28 Prudhoe Bay, one from the Mackenzie Delta, and they
29 meet near Travaillant Lake and then they go south
30 to the Alberta border. Now, they say that this is really

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1 a five year construction project, but there are three
2 years of pipe laying when the most intensive construction
3 activity occurs. But it is from beginning to end a
4 five year project, if they can maintain their construction
5 schedules, and Foothills says that Arctic Gas can't
6 maintain their schedule. They say that they can't main-
7 tain theirs, but let's assume that they could do all
8 of these things.

9 Mr. Horte says that after you
10 have got the thing in the ground, you increase the
11 power at the compressor station so that after a five
12 year period, after installation, you are finally
13 fully powered and you have got four and a half billion
14 cubic feet of gas per day going through this, so then
15 you are faced with the problem, if there is more gas up
16 there and a greater demand in southern Canada and the
17 U.S., you have got to loop. So then you have another
18 -- in other words, you have got a construction project
19 for five years. You have five years of powering up
20 which is presumably limited activity in the vicinity
21 of compressor sights, then you start all over. But of
22 course, the construction project that would be entailed in
23 looping is not as vast as the original project. You still
24 have got your wharves and so on and so forth and your
25 permanent roads -- I guess the snow roads have gone and
26 you have got to start over, and presumably the equipment,
27 new equipment has to be brought in by barge and new
28 pipe and so on. So, once again, you probably have a
29 five year project of considerable magnitude. The 6,000
30 construction workers north of 60, talking about the

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Arctic Gas project, a great proportion of them have to be brought back again, so that you have a five year project, a five year hiatus and another five year project. The three producers: Gulf, Shell, and Imperial form the Beaufort Delta Project to build an oil line, want to have that oil line built by 1983 from the delta to the Alberta border. Now, there are those who might scoff at the likelihood of achieving that by 1983 which is now only seven years away, but if you throw that in too you have got an awful lot of activity from the Delta to the Alberta border.

The likelihood of looping the Prudhoe Bay leg, supply leg, is something that no one has really told us anything about that you could sort of grab hold of. It is very hard to pin that down. There is another factor in all of this, the Beaufort Delta Group wants to build, so to speak, a foothills oil pipeline, that is a Canadian line -- I don't use that in anything but a geographical sense, but if you had that Arctic Gas pipeline built along the North Slope, even if they only intended to loop the main line from Travaillant Lake, south, you still have the corridor/^{established}for purposes of an oil pipeline along the North Slope, which would mean presumably a construction project of the same magnitude as a gas pipeline, and of course an oil pipeline under present technology would be elevated.

Well, I am making this question of yours a total mess up --

MR. SCOTT: Well, I think yours is a different question. The question that I am

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1 really asking is this, it is like the French Revolution.
4 If this panel were asked to assess the impact on the
5 nation of the first battle in the French Revolution, they
6 would come away and say, "Well, there would be no
7 significant impact as it is only going to involve ten
8 people, all of whom will be killed", but if they bore in
9 mind that that first battle would trigger a second and
10 a third and a fourth, the environmental impact assessors
11 might say to them, "All right, now, how should we time
12 these battles, so that no real damage is done to the
13 fabric of our nationhood?"

14 Now, what I am really saying
15 to this panel, from the point of view of looping and from
16 the point of view of other major developments, such
17 as highway, oil line, railway, and so forth, is what do
18 you have to say to us about timing, because if you
19 don't say it now, you won't get another chance in this
20 Inquiry.

21 WITNESS WILIMOVSKY: Mr. Scott,
22 and Mr. Commissioner, I have testified as to looping in
23 response to the Commissioner's question in June, in terms
24 of the aquatic environment and based on the assumptions
25 presented in our report, first and foremost we have not
26 studied the problem in detail. But as I characterize the
27 situation then, presumably the monitoring activity
28 that we have suggested would be in force and at the time
29 that construction was ended or even during the course
30 of it, you would pin point those points, those sections of
the line where damage had occurred, depending on the
nature of the damage and the kind of aquatic organisms

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involved, you could then make a prediction, or even an
absolute measurement and hard assessment at the
recovery times. Now, if you take the worst case of the
slowest growing animal and the amount of time for
recovery for that population, you can make some projections
but we are dealing with many animals, many situations out-
side the aquatic environment, but in general a guideline
would be how long does it take any damage to recover
or to be mitigated?

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2 THE COMMISSIONER: You made the
3 point too, that tends to be overlooked that if you're
4 going to loop this thing or / an oil pipeline and you've
5 already got a gas pipeline in the ground at that stage,
6 you have then conducted the ultimate experiment. You've
7 built the gas pipeline and you're able to measure its
8 impact and presumably that's of some help in the next
9 stage. Well, these are good questions, Mr. Scott.

10 MR. SCOTT: Q Has anybody else
11 anything they would like to add?

12 WITNESS BLISS: Mr. Scott, I think
13 we said back in June ^{that} different biological components are going to
14 create different impacts. When it comes to the surface
15 terrain and vegetation, we already know that the propor-
16 tion of that is 100% impact, it's not just the road;
17 in terms of snow road we don't know how much impact.
18 It will be less but it remains to be seen how much.

19 But also in terms of re-
20 vegetation we've got even better tools of getting things
21 back in shape, and fortunately in terms of looping
22 we're just talking about the forested portion, which
23 is the easiest portion to revegetate. I think it's
24 safe to say other than in areas with erosion from
25 water as well as melt-out, which I'm sure Dr. Thomson
26 will speak to in a minute, problems, we can expect
27 reasonable plant cover back over the berm and adjacent
28 disturbed areas in three to five years, using fertilizer,
29 seeded mats, what have you. Now there will be some
30 areas where we'll have to go back in, in terms of

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2 settlement, water flows, and what have you; but in
3 three to five years there ought to be a reasonable
4 plant cover in terms of erosion control but not thermal
5 control. Forget thermal control. Therefore in
6 five to ten years it would seem from a vegetation or
7 a revegetation standpoint that we could expect a
8 reasonably stabilized situation to ^{have} / taken place prior
9 to going back in.

10 Q I think I understand Dr.
11 Wilimovsky's evidence or his point of view, which is
12 that he'd prefer to make his judgment after the event
13 and with regard to what he actually finds after the
14 project has been done. I take it, Dr. Bliss, that you
15 think on the other hand, bearing in mind the state of
16 the knowledge, that you can predict that the effects of
17 -- that looping will be permissible, is that --

18 A Yes.

19 Q -- what you're saying?

20 A In terms of stable
21 substrate.

22 Q All right, what about the
23 introduction of other projects such as an oil line or
24 a railway within five years?

25 A But they're not going to
26 be along that same right-of-way. I'm assuming that the
27 looping is on the same right-of-way. You have a totally
28 new project you start from square one with a road or
29 a railroad or an oil pipeline. I'm only talking about
30 looping in a previously disturbed area and re-disturbing

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1
2 it.

3 Q I take it, Dr. Wilimovsky,
4 from your point of view a nearby right-of-way would of
5 course perhaps be just as difficult as a crossing on
6 the right-of-way.

7 WITNESS WILIMOVSKY: Your
8 hypothetical question, I'm not sure I could answer it
9 for the entire area. At the commissioners request, I
10 made an estimate that has been referred to many times
11 in this cross-examination, positive, negative, and
12 indifferently. The numbers that I presented to the
13 Inquiry at that time were not off the top of my head.
14 They were based on standard procedures and operational
15 research as far as relative magnitude. One of the
16 witnesses later commented, I seem to recall, that in a
17 real world -- perfect world, I beg your pardon --
18 that there would be no reason why a highway would
19 necessarily be ten times worse than a gas line. I
20 can't agree with that opinion because the estimate of
21 relative magnitude was based on accepted mathematical
22 procedure , and with your permission I'd like to expand
23 on that and say that I considered the Commissioner's
24 question in both the short and long term in four phases:
25 The building, the operation, likely accidents, and
26 abandonment. I considered three elements. I did not
27 consider the railroad, though it would probably fall
28 somewhere near a road and more than an oil line.

29 I considered a gas line, an
30 oil line and a road, and under the building idea, or

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1 building component of this analysis, I considered the
2 thermal gradient for building a buried cold line. You're
3 working with the natural gradient. In operation we're
4 told by ^{the} participants or applicants that with the
5 proper contingency plans there would be no major impact
6 on the environment, but should there be an access except
7 for a large whistle of a blowout with the possible
8 exception of a fire, the contingency plans would cover
9 access and this sort of thing. If they abandoned it
10 it was no problem because it's underground and unless they
11 chose to salvage the metal you don't see anything
12 after it's all rehabilitated after upteen years. An
13 oil line, we must realize, is fighting the gradient the
14 whole way. It's hot, it's got to be built above-ground,
15 with present technology and the problem of insulating
16 a line from the substrate. It's open, / ^{since} it is above
17 ground, to all -- during operation, to environmental
18 impacts such as stopping movements, if you don't
19 provide for migrations and animal movements, and human
20 sabotage as well, as has been threatened in the press.

21 Under accidents, the potential
22 for scars and damage over a much wider area is proven
23 without doubt from other pipelines, hot oil pipelines.
24 In terms of abandonment, we're talking about the problem
25 of removing a physical structure, unless you want to
26 leave this aesthetic object across the tundra forever.

27 Now, they both, both the oil
28 line and gas line, are postulated to have the same
29 order of magnitude in the mathematical sense, life.
30

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2 On the other hand, a road during building requires an
3 enormous amount of materials. In the building of the
4 road and the upkeep of the road, that is during operation
5 you bring in fuel, petrols, people, a constant upkeep
6 and in turn hospitals and so forth for the maintenance
7 of this. In terms of accidents, on the same time scale
8 they are continuous. In terms of removal, it is
9 impossible to remove a road. That scar will be on the
10 environment forever, even if you plant over ^{it} the shadow
11 will still be there.

12 Now I don't care what unit of
13 measurement anyone chooses to take. Under the principles
14 of uncertainty/information, if one takes the gas line
15 as one unit and says this information has a normal
16 distribution, that is all the data seem to fall here
17 and you want to distinguish the next thing, that is
18 the oil line, from it, how different does that have to
19 be? If you look at these things, and it's not a straight
20 arithmetic addition, if you look at it and separate it
21 one normal curve from the other, at a minimum this is
22 calculated as the base E, which has got a value of
23 2.71 something, rounded off to 3. So if you translate
24 this normal distribution back, we're saying that there's
25 at least a difference of three in an oil line from a
26 gas line; and if you go through the same arithmetic
27 for a road, it's six. Now, there's a problem that a
28 road has a much longer lifetime, so under normal opera-
29 tional research procedures you normalize these three
30 calculations, and when you do that the statement that

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1
2 I made that an oil pipeline says it would be at least
3 three to five times greater an environmental impact
4 stands, because those are the uncertainty principles,
5 knowing nothing else, and using any terms of measure that
6 you want, you can prove -- and I'm sure if it were to
7 be built you could make such measurements. Because of
8 the greater life I'm saying that the impact of a road
9 is double that, and if I may respectfully comment, Mr.
10 Commissioner, you characterized me in the testimony on
11 page 15980 as being an anti-road person. I am not anti-
12 or pro, I was simply responding to your question.

13 Q Well, Dr. Wilimovsky,
14 that's very interesting and that exposes in depth the
15 dispute between you and I think Dr. Whitney, as to
16 whether a road is ten times worse or three times worse
17 whatever it is. That -- and I'm glad to have given you
18 the opportunity by opening my mouth to free yourself
19 of that compulsion. But I wonder if we can now come to
20 the thing that troubles me, which is simply this. Is
21 there any member of the panel who wants to give advice
22 or is able to give advice in general terms as to the
23 timing of succeeding projects? I'm talking particularly
24 about the timing of the next loop and the timing let us
25 say of the oil pipeline with relation to this, assuming
26 it follows the same general corridor. If you want us
27 to say if it's your view that it shouldn't be for five
28 years or ten years, now it seems to me is the time to
29 say it. If you haven't a view and can't develop one,
30 that's fine too. But I'd be very disappointed if at

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2 some later stage you said, "Oh well, we were clearly of
3 a view that this shouldn't happen," and you didn't tell
4 us today.
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1 WITNESS MCTAGGART-COWAN: Mr. Scott, I have been
2 wrestling with that and I frankly cannot come up with
3 an objective way of answering that question.

4 Q All right.

5 WITNESS CRAIK: Isn't there
6 two parts to it, the physical environment and the
7 social environment -- maybe we shouldn't be commenting
8 on the social environment part of it, even, but it
9 seems to me that the social and economic factors
10 are very, very major in that decision.

11 Q I would be grateful
12 for any advice. It simply seems to me that someone
13 will invite the Commissioner at some stage to make the
14 recommendation about the sequential staging of the
15 pipeline, the loop and the oil pipeline, and if you
16 gentlemen have nothing to say, I am not asking you for
17 months or days, but if you have nothing to say about how
18 that should be done, very well, we will pass onto some-
19 thing else. But if you do have something to say, I would
20 like to hear it.

21
22 A It would seem that a
23 continuous sequence of events would be the most
24 logical rather than starting in a cool down period and
25 then building up again and so, you know, offhand, that
26 is all -- the answer is almost in the way that you
27 asked the question, I think.

28 Q Anybody else? Dr.
29 Thomson?

WITNESS THOMSON: I think Mr.

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Commissioner was probably as close as anybody and that was when he pointed out that the pipeline will be the ultimate experiment. What I am afraid of is that we will not learn by the mistakes -- whereby, not necessarily mistakes, maybe the other end of the schedule -- what worked well, and in a five-year period from the time that you are powered up, you are running five years and then you decide to loop, many of the key personnel who worked on that line and have this expertise may well have left and gone to some other area. Maybe they are building pipelines in Arabia and are not available, and if this data is not very carefully annotated and becomes available to the next people, those same mistakes will be made again, and again, and the poor old environment will take a beating, and I think Dr. Legget very earlier to this Inquiry pointed out that we have made the same mistakes in highway construction for a large number of years.

THE COMMISSIONER: Excuse me, who was that, sorry?

A Dr. Legget.

THE COMMISSIONER: Dr. Legget, yes.

A Another point, I think is very important from my own experience on the Alaska Highway, was that of maintenance, and I am not sure, Mr. Commissioner, whether this has been brought up at this Inquiry, but after the construction of the pipeline, then in our code we have suggested that maintenance features be brought in, in other words, a pipeline, or, I am

1 sorry, a berm break, if it starts to show erosion, should
2 be corrected. If you have areas in which you have
3 bank instability, these should be corrected, whether
4 or not they affect the pipeline integrity immediately
5 or not, and if this is religiously done, then I don't
6 think the time element, as far as the actual construction
7 goes, and not having to do with the flora or fauna,
8 is very vital.

9
10 Another point that occurred
11 to me is the borrow materials which is a worry to many
12 people, not only the opening up of borrow areas and
13 the transportation from those, but in some areas the
14 good materials are lacking and somebody then is going to
15 have to allocate these and in the same vein, once a
16 borrow area has been established, and perhaps the con-
17 struction phase only uses, say, a proportion of that
18 pit, then at the next construction, people are required
19 to use that same pit and not be allowed to open up
20 new areas and then just scar the landscape that much
21 more.

22 The only timing that I can
23 think of immediately is that area in which gravel is
24 reclaimed from rivers and this may or not be allowable,
25 but I think in some of them you could probably scalp
26 gravel out of rivers. If they are flooding rivers with
27 heavy bed load charge, then it takes about two or three
28 years, as I remember it, for that gravel to be replaced.
29 In other words, you would have to wait some interval of
30 time for that gravel to be replaced to mine it again.

Those are the points that I

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have, Mr. Commissioner.

MR. SCOTT: Well, that was helpful, Dr. Thomson, particularly with respect to the gravel pits. Has anybody anything else that they want to say about timing this project or succeeding developments before we move on?

WITNESS TEMPLETON: Mr. Scott, I think if you were going to loop within five years, I really think that if you seriously thought that that was going to happen, I think you should turn the application back and say your project description is not adequate because it is the same project and it is a matter of how many years you put on it before the next phase comes and if it is another project, I suppose the impact would have to be reviewed at that time and the effects of the old project reviewed. So, I would certainly say that it should be more than five years. I would be more inclined to think that the next project should be in the vicinity of ten years before you want to start again.

Q Well, if nobody has anything else to add on timing succeeding developments, let me come to another question. One of the fundamental recommendations in your report, so fundamental that this one is to go ahead even if the project doesn't, is that there should be a -- that the government should prepare a land use plan regardless of whether the project goes ahead.

What is the objective of the Board, you may think this odd, Mr. Templeton, but what

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1 is the objective of the Board in saying that there should
2 be a land use plan? That is a slogan that is attractive
3 to me, but I just want to know what the objectives you
4 sought to protect were in stipulating that as an important
5 condition?

6
7 A If you don't have a land
8 use plan you can't really approve anything because you
9 need to know how are you going to use your resource
10 of the North, and if you just use it indiscriminately,
11 you don't have any resource left. So, you need to -- there
12 is a need to plan the whole use of the North. It needs
13 areas for the people of the North to maintain their
14 culture and the rest of it. It needs areas for develop-
15 ment. It needs corridors for transportation, and all
16 of those things are part of a land use plan. I don't
17 think that anybody would ever suggest, although I think
18 that it has been suggested in one city in the United
19 States that they not have any zoning.

20 Q Well, Mr. Templeton, would
21 you agree with me that land use planning is fundamentally
22 a political or governmental function?

23 A Yes.

24 Q Yes, and before it can
25 be done, the agency doing it must have determined the
26 objectives of the plan. For example in the case of the
27 Northwest Territories and land use planning, the political
28 agency will make the judgment that the objective of
29 planning the land of the Northwest Territories is to
30 see to it that as much oil and gas would get developed and
down into southern Canada as possible on the one hand, or

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on the other, to see to it that as much land is reserved for agricultural and trapping uses as is possible on the other. But before you can do your planning, you have to have made your judgments about what priorities are important.

A Yes.

Q All right, and if those judgments are made, they determine how the land is planned.

A Yes.

Q And so that there is no advantage that would exist in having a land use plan when we confront this application, is there?

A Yes, because we don't know whether the application fits the land use plan.

Q Well, all right, is that the only virtue of the plan that you see?

A Well, it is not -- the virtue of the plan is not to allow this project to go ahead, it is how we are going to use the resource.

Q Well, before I come to Dr. Bliss, who is very anxious to get into this, may I just ask you this, if we were drawing up a land use plan tomorrow, what would you put on it? How would it make our pipeline application better and what would you put on it?

A Well, you would decide whether you can accommodate a corridor within that plan.

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2 And for example, we say if
3 we were drawing a plan we would not accept a corridor
4 across the Northern Yukon.

5 THE COMMISSIONER: Well, let
6 me stop you there because I think you're getting to the
7 guts of this thing. Surely the reason why you wanted
8 a land use plan drawn up in advance of the pipeline is
9 because once you go ahead with the pipeline you -- that
10 becomes your land use plan. You are pre-empting the
11 choices you might have made earlier, and of course one
12 of these choices that I gather you would have made, that
13 you would make if you had the power, is the one you
14 just mentioned, that you would say the Northern Yukon
15 ought to be inviolate. Is that what you would do if you
16 were running things?

17 A Well, I think we could
18 accept a gas pipeline. We could not accept a multiple
19 transportation corridor. Multi-use corridor.

20 M R. SCOTT: Well, I saw and
21 heard Dr. Bliss say precisely to the concept that the
22 Commissioner referred, and I take it that that concept
23 was that the selection of the corridor is a fundamental
24 planning function. Have I got that right, Dr. Bliss?

25 WITNESS BLISS: Oh yes, Mr.
26 Scott. It starts a chain reaction and having written
27 this testimony that was entered in and having spent some
28 time thinking about it, I should comment;
29 what triggered our collective thinking and my specific
30 thinking was that in essence we still have vast areas

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2 of the north that have been relatively little touched
3 by industrialized man, and once we begin this chain of
4 events, we can't very well shift the pattern readily,
5 and specifically back to what Mr. Templeton has said,
6 you too, Mr. Commissioner, it's a personal judgment
7 but one of the things that if I were involved in this
8 land use plan would be that if a decision were made to
9 go across the coast of the Yukon with a gas pipeline,
10 I think the stipulation should include in that that
11 there will be no road, and that there will be encourage-
12 ment in fact, pressure for the development of a Yukon
13 as well as a modification of the Alaskan Wildlife Range
14 into a wilderness area, so that you begin to have some
15 of these tradeoffs and some immediate establishment
16 of patterns. Yes, it's beginning to play God in this
17 sense; but trying to divide the land into terms of
18 what you think the land can provide and realizing if you
19 do one thing you are triggering a chain of events that
20 would lead you down a given path and to try to think
21 through this a bit in advance to realize where
22 you may be headed.

23 Q Well, if that be so,
24 then it seems to me that this Inquiry is engaged in the
25 regional planning process, properly understood, and
26 insofar as it makes recommendations about a corridor
27 and other land use, is doing the fundamental work of
28 preparing the regional plan that you call for in your
29 report. Now with that in mind we've heard how you fall
30 on interior versus coastal route, and how you explain

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2 why you fall where you fall on that issue. Was it
3 within the authority of the Board to consider whether
4 this corridor was in the right place to begin with?
5 Or did you just have to take that as a given?

6 WITNESS TEMPLETON:

7 A Well, that caused us a
8 great deal of trouble at first because in any impact
9 assessment process you are -- you should consider alter-
10 natives, and we didn't really have the alternatives to
11 be able to study. Ordinarily you look in a broad way
12 at alternatives and then you begin to narrow them down
13 and so on. We didn't like the idea of not having
14 alternatives because basically the route was given to
15 us. However, in looking at it, it wasn't that bad a ^{I shouldn't say that}
16 route, but the Mackenzie Valley appeared to be set by
17 the villages that are there and certainly the government,
18 etc., are going to build a road and so it wasn't that
19 bad a route as far as a gas pipeline was concerned.

20 Q Well, what concerns me
21 is that if this is the regional planning process, and
22 if the Board has given conditional approval to this
23 project I'm concerned to know whether in doing that
24 it evaluated this corridor as opposed to any others, or
25 whether its function, as it conceived it, or perhaps
26 as was imposed on it by events and circumstances, was
27 to evaluate this project in place because it does make
28 a difference if you listen to what the Board says about
29 what's good and bad.

30 WITNESS BLISS: Mr. Scott, I
think it's the latter. We evaluated the project in

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2 place by and large. We did not deal in a completely
3 open manner and try on our own to initiate where we
4 thought a corridor should be. We accepted the one you
5 posed collectively by the government and the applicant.

6 Q Well now, having said
7 that, can I go on to ask the Board whether they have
8 any recommendations to make to the planners who they
9 see before them, or the others that may follow them,
10 when recommendations are made, as to what -- as to
11 land use in the Northwest Territories?

12 WITNESS GOURDEAU: Well, I
13 something. I don't know
14 would like to say / if it will help you, but it seems
15 to me that a land use plan would not only permit
16 the society to decide where certain development
17 would be done, where other developments will not be
18 done, but it would permit also to establish the pace
19 of development; and I think this is a most important
20 thing. It's curious, in fact, that we call development
21 the distinguishing of our resources. We say that we
22 develop the north but in fact we are extinguishing it
23 when we take all the non-renewable resources from the
24 north, and I have nothing against that. It has surely
25 to be done, but the pace with which we do that can
26 very well fit in a land use plan. If you don't have
27 any land use plan, you don't know exactly where you
28 will have to take resources first, and other resources
29 second for how many years and everything. It's very
30 difficult to plan. As soon as you make a discovery,
you all go for it and you do it and finally this is

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2 what determines the land use and so I think this is very
3 important component of a land use plan, is that it
4 permits to determine ^{the} pace of the development and maybe
5 this joins in with what you said about the looping and
6 everything. There is a question of timing there.

7 Q That ties my second
8 question to the first very nicely; but what I want to
9 know is do the members of the Board have anything to tell
10 us about land use in the Territories, or do they have
11 any submissions to make to the planning authority, what-
12 ever it may be, as to -- not only as to specific uses
13 but as to how this land use plan should be developed?

14 A Well, if I may, I could
15 speak for myself again that in view of the new
16 interest of our society at large, not only Canada but
17 in the rest of the world, to keep alive important parts
18 of the planet for future generations, the biological
19 productivity becomes a very important thing to pro-
20 tect and so I would say that this is a fundamental
21 element in any land use plan, to first try to determine
22 what is the biological productivity and how -- what are
23 the requirements in the land use plan in terms of
24 pacing of the development, in terms of localization of
25 development, in terms of the role of the northern
26 residents in all this, what are the conditions really
27 to keep that biological productivity for as long as
28 possible, in fact as long as we decide to keep it?

29 WITNESS WILIMOVSKY: Mr. Scott,
30 I'd like to add a brief comment to what has been said.

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2 There are many definitions and concepts of land use
3 planning. I think it's very important that we're talking
4 about a very broad and general one. Having a broad
5 general plan doesn't necessarily mean that that
6 plan limits your options or sets in concrete. You should
7 review such a document at regular intervals. What I
8 am concerned about your question in terms of advice is
9 that given a requirement to assess a corridor or some-
10 thing like this, you have two choices fundamentally.
11 If you want to get from point A to B, you can look at
12 the overall picture to see what is the best route to
13 get from A to B, or you can have a sketch map drawn
14 as such was handed to us, of a proposed route and then
15 evaluate it. What the Board, at least some of us felt
16 that the government should have established and should
17 even now establish a general overview so that guidance
18 of future Inquiries such as this one would be made
19 easier in determining what rate and what areas could
20 be developed. What I am at a loss to understand and
21 it probably reflects my ignorance of the available
22 material from Ottawa, is we've had an Arctic Land
23 Use Planning Unit in existence for a number of years
24 but I haven't seen any broad overview for the north.
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1 WITNESS CRAIK: If I could
2 comment, Mr. Commissioner, without a land use plan, of
3 some sort, what you fall into is that what is under the
4 land dictates what happens above the land and on the
5 land, and that is where we are at the present time.
6 Basically what is going to happen to the terrain and
7 what is going to happen to the animals and birds and
8 other things is going to be dictated by what we
9 decide to do with the resource from under the land and
10 a complete land use plan to try and describe it to you
11 may be quite awkward and difficult for us to do, but one
12 of the first moves that you can make, of course, is to
13 make certain areas inviolate and that has been the
14 discussion of the Wildlife Range, and we have discussed on
15 occasion the preserve in the areas like the Rat Pass,
16 that are unique, and members of the Board have discussed
17 at times taking certain wild rivers and trying to put
18 in a plug for the preservation of these wild rivers and
19 make them inviolate before somebody decides that their
20 first priority is for use for transportation or for
21 a power site, and to say that this is trying to arrive
22 at something that first of all makes certain areas that
23 are regarded as being important to preserve in their
24 natural state, to make them inviolate, and that is perhaps
25 a first step towards land use planning and even that would
26 help quite a bit.

27 Q Well, I think that the
28 Inquiry understands the function and the desirability
29 of the land use plan. It is also evident that there
30 isn't one and we are operating ad hoc because one is

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being created by impending application for a pipeline.

Now, the thing that I have difficulty finding in the report and perhaps it is not too late to ask the Board to consider this, is what land use recommendations would it make with respect to the Northwest Territories?

WITNESS TEMPLETON: Mr. Scott, we were faced with this because we realized that if we went along with the proposal, we were in effect doing some land use planning in an ad hoc basis, and we recognize that something should be done and not just of the corridor, but of the whole north and in September the 15th, '72, I think it was, newsletter the Board put out, we appended to it what is called a prescript to the Department of Public Works, Government of Canada, to initiate a western Arctic transportation group to select a corridor as one of the techniques. Now, the Parks Department, when they are working on new national parks, go through quite a procedure. There are techniques. If the government decides they want to do it, there are a number of ways of going at it. It involves all the people in Canada and certainly all the people of the north as to what they want to do, what the future of the north should be, and I think there are the techniques available. I think there are people experienced in that if the government decided that they wanted to do it.

Q Well, Mr. Templeton, what I am asking you, is, is the Board then, maybe the Board is coming near the end of its long life, but is the Board able to make recommendations about land use, or

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1 is it simply able to say there should be somebody
2 doing it, we have nothing to say on that subject?

3 A We can't do it. It is
4 a Canadian operation, not a little ad hoc group like
5 ours. We as individuals would certainly like to put
6 our nickels worth in, but it's --

7 Q Well, it is your nickels
8 worth that I would like, you see. I recognize that
9 you shouldn't -- that you haven't and shouldn't be
10 allowed to have the authority to plan for all Canadians,
11 but it is your nickels worth that I want. What are the
12 views of this panel about how land should be used in
13 this part of the Territories?

14 WITNESS MCTAGGART-COWAN: Mr.
15 Scott, there is, as you are probably are pretty well
16 aware, in southern Canada, and was supposed to cover
17 northern Canada also, the Canadian Land Use Inventory
18 Process which has issued volumes of maps and volumes
19 of very interesting data on the potential for land .
20 Now, we could designate and indeed have designated
21 certain areas that we think are pre-eminently suited for
22 certain types of use, but that is about as far as we could
23 go and these are only on the areas where we have
24 studied, whereas, the job is a massive one.

25 Q Just so that I will be
26 clear, Dr. Cowan, where have you designated that so that
27 we can find it?

28 A For instance we have
29 stated that the wetlands areas of the Ramparts River,
30 or we have stated that Old Crow is best suited for the

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production of waterfowl and fur and so on. I couldn't give you page references at the moment. Some of it may be by inference rather than specific detail.

Q So that I take it, however, that what you are referring to is the body of your report that is before the Inquiry.

A Yes.

Q -- and the inferential conclusions that come from your comments there.

A Yes, sir, and we have also specified that there are certain areas that are known to the Canadian Wildlife Service, but which we have not specified for specific reasons that are absolutely essential to the continuing survival of species like the whooping crane, or species like the peregrine falcon and species like the gyrfalcon, these are known and should be set aside for these purposes and these should be the pre-eminent purposes of those particular areas, and quite a lot of the planning process, quite a lot of the basic data that has been assembled for the region, that all of us have been concerned with collectively, that would lead to designations of what would look to be best land uses for certain sectors.

The Canadian Land Use Inventory has in most people's view, been a successful adventure and it should certainly be turned into the north to assist in the planning process.

Q I guess what basically troubles me is that one of my duties at the end of

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this Inquiry will be to produce for all the participants a series of recommendations to be discussed, and I am trying to get help from all these witnesses who appear as to what those recommendations should be, and I am very grateful for the general statements that are provided, but I find it hard to get specific recommendations and that is why I pressed you a little on that subject. If any occurred to you I would be grateful -- Dr. Bliss.

WITNESS BLISS: I am not sure whether I can help you out or not, but one can say as a broad generalization within the tundra that you are going to raise a renewable biological resource, it is wildlife, it is not vegetation, you can't harvest it. So there is no potential for farming. You have to come a long way south before there is really a potential for crop farming, except in a very localized, village basis. There are relatively few areas of reasonably productive land for forests, so that these kinds of things can be not only documented, but hopefully ensure that people don't go out and attempt what is relatively impossible. We are still clearing land in the Peace River country and this becomes more marginal each year in terms of its ability to produce grain, and yet there are a lot of farmers caught up in this. Let's not make those kinds of mistakes further north.

THE COMMISSIONER: There are one or two matters that I would like to ask you about, in this vein. One is that -- now, you people have said in

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1 your report that you believe that there should have been
2 a settlement of the land claims of the native peoples
3 before a pipeline is built. A land use plan for the
4 north, is it something that the sovereign power we know
5 of as Canada should carry out before or after a
6 settlement of the land claims? It is the policy of
7 the Government of Canada to settle the land claims of
8 the native people of the North.
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2 This, I must confess, hadn't
3 occurred to me until this moment and perhaps it hasn't
4 to you, but you might reflect upon that. I think most
5 of us can say, I'm talking now about a land use plan
6 and settlement of land claims, I'm not talking about
7 pipelines, we'll get onto that in a moment, most of us
8 would say, "Well," I suppose we'd say, "you'd have to
9 settle the land claims and then work out your land
10 use plan." But would that be sound? I don't know.

11 There's another question, not
12 related, I suppose, but it is related to the land use
13 plan, and that is in places like Alberta and B.C.
14 and all over the country the Federal Government has
15 established National Parks, Banff National Park and
16 so on and so forth. Now in those parks as I under-
17 stand it, no industrial activities are allowed. The
18 controversy in Alberta about mining in parks is in
19 Provincial Parks, isn't it? So that Canada as a
20 nation has decided that in those National Parks in
21 Alberta and B.C. there will be no industrial activity;
22 presumably if somebody went in there with a geiger
23 counter or whatever, came out and said, "There's
24 \$10 hundred billion of uranium there." The Government
25 of Canada would be confronted with a problem but to
26 this date the government has said, "No industrial use
27 and the only commercial use are hotels and things of
28 that sort."

29 Now, is that -- there's a
30 at Nahanni.
National Park over here / There's another one up near

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2 Frobisher Bay. Do they call it Broughton Island? I've
3 forgotten. The National Park at Nahanni there is mining
4 use allowed there, I think. You're really saying, Mr.
5 Templeton, about this park -- you didn't call it a
6 park, you're asking for the establishment of something
7 that falls short of a National Park in Northern Yukon
8 because you're saying you agree to this industrial use
9 of a gas pipeline. What I'm musing here, and I hope
10 no one thinks that any of this is --

11 WITNESS TEMPLETON: The reference
12 I made to parks is the techniques used in the land use
13 planning rather than saying the whole Northwest
14 Territories and Yukon should be some kind of a park.

15 Q I know that, but what I
16 was getting at is the Northern Yukon, you and many other
17 witnesses have said it should be regarded as a unique
18 area, and you say that it should be set aside --
19 whether you call it a park or not -- it's set aside by
20 Statute and only certain uses are permitted, you're
21 willing to allow one industrial use, the gas pipeline.
22 So that its status would not be comparable to say
23 Banff National Park or Jasper National Park. Now I
24 know that there's one other thing, and Dr. Livingston
25 and Dr. Gunn, Dr. Livingston was a witness in the
26 overview and Dr. Gunn was a witness last December, and
27 they -- Dr. Gunn said they had proposed at one stage
28 that instead of, in the north instead of setting aside
29 these ranges or parks, instead of short of saying,
30 "Well, that's where it's going to be, you can't go in

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2 there with your bulldozers."

3 They said, "Well, why not
4 set aside the industrial areas, operate from the other
5 end, operate on the assumption that everything is
6 excluded as far as industrial use is concerned and you
7 limit industrial use instead of taking it on the basis
8 that everything is open to industrial use, and it is
9 the ecological recreational use that would have to be
10 hived off to preserve it at all."

11 Well, if anyone has anything
12 to say about any of those matters, go ahead.

13 WITNESS Mc TAGGART-COWAN: Mr.
14 Commissioner, in the National Parks there is a long
15 history of the gradual extinguishment of pre-existing
16 rights. In Yoho National Park at Field there was a mine
17 operating for many years. The tramway went right across
18 over the highway high up, and that has been extinguished.
19 During the 1940 war there was a mine opened in Banff
20 Park under the closest possible supervision, I think
21 probably ownership by the Federal Government, and mined
22 some very rare mineral that was needed for the war
23 effort, and which occurred almost nowhere else in
24 Canada. Now that was shut down immediately the need for
25 it was over, so your general principle is correct.

26 When the Canadian Arctic Wild-
27 life Range Society was looking at the potential for
28 extending the Western Arctic Wildlife Range across the
29 Yukon, we recognized that there were existing rights
30 which should persist, those of the Old Crow people, for

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2 instance, in fact it was the Chief of the Old Crow people
3 that seconded the resolution asking the Federal Government
4 to establish it, and the hunting, all the traditional
5 use that was made of that area by the Old Crow people
6 were to persist, according to the request that we
7 made. It was also part of our request -- I think I'm
8 quoting the wording correctly -- that other uses which
9 could be made compatible with the primary objective
10 would be permissible. This was recognizing de facto
11 situations -- mining leases in the area and so on and
12 so forth. So that what we were asking for, what we're
13 still asking for, I'm now speaking with another hat,
14 I'm with the Canadian Arctic Wildlife Range Study,
15 is that this be set aside for the uses which we, having
16 looked at carefully, thought were the best uses for it
17 and of course society has to make that decision.
18 Society is represented by the Minister of Northern
19 Affairs & Indian Development. It was -- the decision was
20 on the point of being made, but then other factors
21 intervened.

22 Q When the conference was
23 held, Dr. McTaggart-Cowan, and that resolution was
24 passed by Mr. Cretian, was anything said by your
25 group about whether a pipeline, be it gas or oil,
26 should be allowed across the range?

27 A This was certainly discus-
28 sed in committee, but there was nothing specified in
29 the request.

30 Q So it wasn't either in or

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out?

A That's right.

MR. MARSHALL: Mr. Commissioner,
it was just pointed out to me that with respect to the
National Parks, the Trans-Mountain Oil Pipeline that
goes, I think, from Edmonton to Vancouver, does go
through Jasper National Park, it crosses it.

THE COMMISSIONER: Yes.

MR. MARSHALL: As of course do
both the C.N. mainline goes through the Jasper Park,
and the C.P. through Banff. I think those are prior
-- uses prior to the creation of the park, excepting the
oil pipeline, of course, which is much more recent.

A But the effect that we've
been referring to of that initial decision making it
logical to take subsequent decisions downstream, is
very evident in these parks. Because there was an initial
railway there, it became logical to put the road
there. Because the road was there and the traffic
density increased, it becomes logical to double-lane the
thing. Because the railway is there and it's therefore
logical enough to build another one, the discussion is
now being made of double-tracking the railways through
Banff National Park. So this is the whole business of
the additive effect. Once you've made one decision it
pre-empts other decisions downstream. This, I think,
is what Mr. Scott has been referring to in terms of the
whole question of decision being taken -- in other words
the first in time becomes first in right, and then you

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1
2 go on from there.

3 MR. SCOTT: May I come to one
4 other matter before the end of the day? One of the other
5 unique features of the Board's report is its proposal
6 that we dealt with earlier today for -- I forget what
7 they call it, but I think an auditor group is as good
8 an expression/^{as any}-- which would not be the applicant or
9 its inspection facilities, it would not be the agency
10 or its inspection facilities, but would be a group of
11 independent persons, in the words of the report at page
12 55,

13 "clearly independent of government, applicant,
14 and its contractors."

15 And I take that summarizing your report, that the
16 function of this group is not to do any of the in-depth
17 controlling or monitoring, but is to provide a reporting
18 function between the process on the one hand, and the
19 public, who are supposedly the beneficiaries of the
20 process on the other.
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1 And generally, to keep
2 everybody honest by getting publicity. Have I got it
3 right, Mr. Templeton.

4 WITNESS TEMPLETON: Yes.

5 Q And Dr. Cowan and Dr.
6 Wilimovsky, would I be correct and I think perhaps you
7 said this yesterday that this feature is modeled on the
8 Alaska model?

9 WITNESS McTAGGART-COWAN: We
10 suggested this before the Alaska Highway was conceived.

11 Q I am sorry. I did not
12 mean to suggest that there was any time significance but
13 I take it that the Arctic Environmental Council
14 theoretically in Alaska is performing the same kind of
15 functions, is it not? No doubt in response to your report.

16 A Theoretically is the
17 operative word.

18 Q All right, well now, because
19 you have proposed something which has been adopted
20 somewhere else, I would like to ask you what you have
21 learned about how it works in Alaska that leads you to
22 expand on or qualify your proposal here. Because this
23 is interesting. You see, here you have made a proposal,
24 another jurisdiction has taken it up and we have a
25 good way of knowing the advantages and the disadvantages
26 of it now from a period of experience.

27 WITNESS WILIMOVSKY: The
28 Alaska example was not patterned after our discussion.
29 It is a common concept in environmental protection and
30 mitigative process to have an auditor group and these

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1 have taken a number of forms in different parts of the
2 world. We have devoted within the Board a great deal
3 of discussion as to the most effective means that such
4 an auditor group would operate and I do not think
5 that reference to the Alaskan example is pertinent in
6 one sense of the word. Mainly that the pattern there is
7 not what we are proposing as I tried to suggest in
8 yesterday's testimony. If you state the objective as
9 we have in our previous testimony -- what an auditor
10 body should do, then you have the problem of deciding
11 how, what numbers and what composition the Board should
12 be made, what powers it has to obtain reports and
13 information from the inspecting bodies, both government
14 and project proponent, and how is it or what is the best
15 mechanism to provide this information to the public.
16

17 There is an internal
18 management question too and that is if
19 the auditing group is not properly constructed, it can
20 fall by the wayside through inactivity, lack of funds
21 and so forth.

22 Now there are many procedures
23 in the open and internal literature on how to do this.
24 I don't think that it would be --

25 O Dr. Wilimovsky, could I
26 interrupt you to ask you this and perhaps Dr. Cowan
27 could speak to this. I take it that if you knew
28 that your auditor group was going to function like
29 the one in Alaska, you would not bother to recommend it.
30 That isn't what you have in mind.

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WITNESS McTAGGART-COWAN: That is
not what we have in mind.

Q All right now. You know
what exists in Alaska.

A Yes.

Q Now, we can all write glossy
profiles of agencies, what has to be done to make the
one in Alaska do what you want it to do?

Or would you prefer to
describe in the same measure of detail general statements,
too late for general statements, the same measure of
detail if you can what you want in the Northwest
Territories?

WITNESS WILIMOVSKY: I take it
you want me to write your recommendation for you.

Q No, I want you to come as
close -- I want you to come as close as you can so you
won't want to be unduly critical of the recommendation
that we make and so that you will be able to say -- well,
I gave them my best.

A Well, there are technical and
political matters on the composition of the team.

First of all, you want to
decide what components from what part of Canada you
want represented on this Board -- Native peoples,
residents of the North, southerners, easterners, western-
ers, etc. Then you want to know whether these represent
or to what degree the industrial sector, the political

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parties, the various interest groups. Then you want to know how you approach the various bodies to get nominations and what the selection process is.

Then you want to go back to the Harvard Business Review and review all of the literature on the optimum committee size because you can get a committee that is so big that it would be useless to operate.

Q Well, what is your view?

A My view is that the optimum committee size is between seven and eleven.

Q All right, what is your view about the composition of the committee?

A A driver, a good secretary, someone to keep the humour in the committee, someone to keep you honest, but that's, you know, these are practical things that make a committee work or fail.

Q Yes, I understand that, but these are considerations that have to be taken into account and I am grateful for your judgment about these things and it is important, and if you have other judgments about the composition of the committee at this stage, I would be glad to have them. If it is premature you will feel free to say so.

A Mr. Scott, this Board, to my view, has always worked in the strategic sense, giving the overview. The details that I realize you are

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going to have the weight of helping to prepare, are technical matters. I think the Board could help you in this way if it were given such an assignment and had the necessary funding and staff, and so forth. A lot of thought has gone into this. I am not sure to what benefit it does to reiterate it in this form.

Q Well, let me tell you why I think that it is beneficial, and I may be wrong. I think that it is beneficial because if it isn't introduced in this form, it may not be introduced in this process at all, and I think that that would be a grave misfortune, if the thought that you people have obviously given to these matters was not disclosed, and I am grateful to have it disclosed in the generalized way it must be in your report. All I am saying, and I am not trying to escape from the burden of making recommendations to the Commissioner, I am trying to get help in that exercise, and if you gentlemen have any views about this auditor group that you think should be put into force, I would be glad to have them.

A Mr. Scott, if you are going to keep us here till tomorrow, I will be happy to put my thoughts in some logical order this evening, but --

Q The answer to the first question is yes, and my answer to the second question is thank you very much.

(LAUGHTER)

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A I trust that I will get
the usual consultant's fee?

(LAUGHTER)

Q Well, we will see about
that. Don't spend it.

THE COMMISSIONER: Could I
just ask a question or two about this? The council that
Dr. Cowan and you belong to in Alaska, Dr. Wilimovsky, is
a private group, isn't it? You have no statutory
mandate. You can't go in there and say, "We want to
go to Glenallen camp, we don't want to look at the
stream ten miles north of such and such"?

A But out of fairness to
the company, let me turn that 180° around, we have
never been refused a request to go someplace or to
see something. I think the intent is wholly laudible
to try and make the operation available to an auditor
group. I think, sir, respectfully, that it is an
awkward matter to discuss an operation of an auditor
group in another company under different auspices and
I will try and treat the support and the responsibilities
and where money comes from and where these other
related areas in my redress to Mr. Scott tomorrow, if
you will permit me, sir.

MR. SCOTT: It may be, Dr.
Wilimovsky, or Dr. Cowan, that there is some other model
to which you think we might be looking as well, but all
I am saying is that if we have a model and no matter
how remote from our present experience in Alaska and
is doing useful and good work, it is good to look at that

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1 and it is good to know from participants how it could
2 be made better, that is not to fault the existing one,
3 that is simply to say that man is perfectable, he is
4 moving on that course.

5 THE COMMISSIONER: Well, on
6 that note --

7 MR. SCOTT: Cheery note.

8 THE COMMISSIONER: I think
9 that we have gone as far as we can today and I am
10 sorry that we have to ask you to remain until tomorrow,
11 gentlemen, but you were here back in June before we
12 had really undertaken an examination of the environmental
13 evidence. You gave us an overview that I think was
14 very helpful, and not withstanding what Dr. Wilimovsky
15 has said, you gave us some pretty detailed, tactical
16 recommendations. I cite the Environmental Code as an
17 example. We have since been through many months of
18 evidence of environmental questions and to have you
19 here now when we are just concluding that evidence,
20 I think is helpful. I am not concerned that you weren't
21 cross-examined back in June. I think we're perhaps getting
22 more of it now by bringing you back six months later than
23 we would have then.

24 So, we will adjourn until 9:30 in
25 in the morning then.

26 MR. SCOTT: Mr. Commissioner, that
27 the motion that you proposed be argued at 9:30 should be
28 argued when this panel is finished so that we can begin
29 right away with this panel and get them completed as
30 quickly as possible?

THE COMMISSIONER: Okay, 9:30
tomorrow.

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AUTHOR
13 Jan., '76. Vol.
TITLE
Mackenzie Valley Pipeline Inquiry

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